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THESIS

**DEFENSE HEALTH AGENCY AND THE DEPLOYMENT
OF THE ELECTRONIC HEALTH RECORD: BUILDING
AN ORGANIZATIONAL FRAMEWORK FOR
IMPLEMENTATION AND SUSTAINMENT**

by

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December 2016

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FRAMEWORK FOR IMPLEMENTATION AND SUSTAINMENT**

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ABSTRACT

This thesis explores the Defense Health Agency's (DHA) implementation and sustainment of the newly acquired electronic health record (EHR). The Military Health System (MHS) is utilizing a disjointed taxonomy of patient health record systems to deliver health services that are cumbersome to both the end users and the health information technology specialists in its use and delivery. The acquisition of the new commercial off-the-shelf EHR in 2016 from Cerner-Leidos-Accenture offers an enterprise solution to the MHS. This advanced IT solution requires detailed, deliberate implementation and deployment planning by the DHA, which will result in the effective, efficient, and economical delivery of healthcare services to Department of Defense personnel. Utilizing a case study approach, the authors conducted interviews at two sites within the DHA EHR deployment footprint and correlated results with the application and research of Kates and Galbraith's star model. The authors conclude that with appropriate change management efforts, communication of strategy and structure, measurement of metrics, and investment in people, the DHA has the ability to implement MHS GENESIS within reasonable schedule parameters and achieve equitable sustainment.

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LIST OF ACRONYMS AND ABBREVIATIONS

CFO	chief financial officer
CIO	chief information officer
CSF	critical success factors
DOD	Department of Defense
DHA	Defense Health Agency
DHMS	Defense Health Management System
EHR	electronic health record
ERP	Enterprise Resource Planning (System)
GAO	Government Accountability Office
HIPPA	Health Insurance Portability and Accountability Act
HIT	health information technology
IAO	information assurance officer
IM	information management
IS	information system
IT	information technology
KP	Kaiser Permanente
MHS	Military Health System
MTF	military treatment facility
NMW	Navy Medicine West
PEO	program executive officer
PNW	Pacific Northwest
POC	point of contact

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I. INTRODUCTION

A. BACKGROUND

The United States Congress recently designated an agency to create, manage, and lead the Military Health System's (MHS) Health Information Technology (HIT) Enterprise (Nyberg & Sezgin, 2016). The newly formed Defense Health Agency (DHA) was created in 2013, and it is tasked to serve several significant purposes. They are the following: manage the information technology enterprise across the Military Health System (MHS), integrate the component services (Army, Air Force, Navy, and Marine Corps) HIT systems and applications, and deploy the new acquired electronic health record (EHR) (Nyberg & Sezgin, 2016). This includes implementing a shared services environment that creates a cost savings in HIT (Government Accountability Office [GAO], 2015). The agency has an enormous responsibility to the military service components and the 220,000 medical personnel, 9.5 million beneficiaries, and the newly formed HIT Enterprise (GAO, 2015; Defense Health Agency, n.d.).

The DHA's strategy, organizational structure, and business processes introduce organizational challenges to the promulgation of change within the newly appointed agency and the component services (Nyberg & Sezgin, 2016). In July 2015, the DHA awarded Cerner-Leidos-Accenture an \$11 billion, 18-year EHR contract for the MHS, which includes all service components (Sullivan, 2015). The proposed deployment date will commence in January 2017 across the MHS and reach over 1,000 medical treatment facilities (MTF) by the year 2020 (Sullivan, 2015). The issues that will accompany its deployment across the enterprise will surely be met with a multitude of organizational barriers regarding the implementation and deployment of the EHR and related systems. These challenges will require a particular business finesse and leaders with a unique acumen to ensure the successful deployment and implementation of the EHR system occurs across the MHS Enterprise.

B. PROBLEM STATEMENT

The DHA needs to effectively deploy and implement the EHR across the MHS enterprise to achieve its mission, which is to provide and deliver high quality, patient centered (or focused) care (Nyberg & Sezgin, 2016). The MHS is utilizing a disjointed taxonomy of patient health record systems to deliver health services that are cumbersome to both the end users and the health information technology specialists in its use and delivery. The acquisition of the new commercial off-the-shelf EHR in 2016 from Cerner-Leidos-Accenture offers an enterprise solution to the MHS (Nyberg & Sezgin, 2016). This advanced (information technology) IT solution will require detailed, deliberate implementation and deployment planning by the DHA to result in the effective, efficient, and economical delivery of healthcare services to Department of Defense personnel (Nyberg & Sezgin, 2016). It is imperative that the DHA incorporate a strategy and organizational structure that supports viable and effective business processes, includes skilled personnel who utilize the EHR, and includes a system of rewards for those personnel who support the EHR within the MHS.

C. PURPOSE STATEMENT

The purpose of this thesis is to examine the potential organizational barriers and challenges with the implementation of the new EHR, which is known as MHS GENESIS (see Appendix B for additional information related to MHS GENESIS). Specifically, the authors evaluated and recommended a viable implementation and sustainment strategy for the DHA. The strategy addresses the barriers effecting the implementation and sustainment of MHS GENESIS. Strategy development includes the evaluation of the following: integrating strategy into system implementation and sustainment, implementing business processes, developing skilled IT personnel, and creating a system of rewards for IT personnel. DHA may incur additional delays with implementation of the EHR due to service component cultures and related policies as well as regulations that enforce the cultural barriers (and associated challenges). The absence of an enterprise strategy to address these challenges validates the need for DHA to design a defined,

methodical strategic approach to the EHR deployment across the MHS. This necessitates the evaluation of DHA's strategic goals and strategic development.

The writers accomplish these thesis goals through the application of Galbraith's organizational efficiency star model (see Figure 1) to circumvent the barriers and challenges across MHS HIT enterprise to achieve DHA's strategic goals and objectives (Nyberg & Sezgin, 2016).

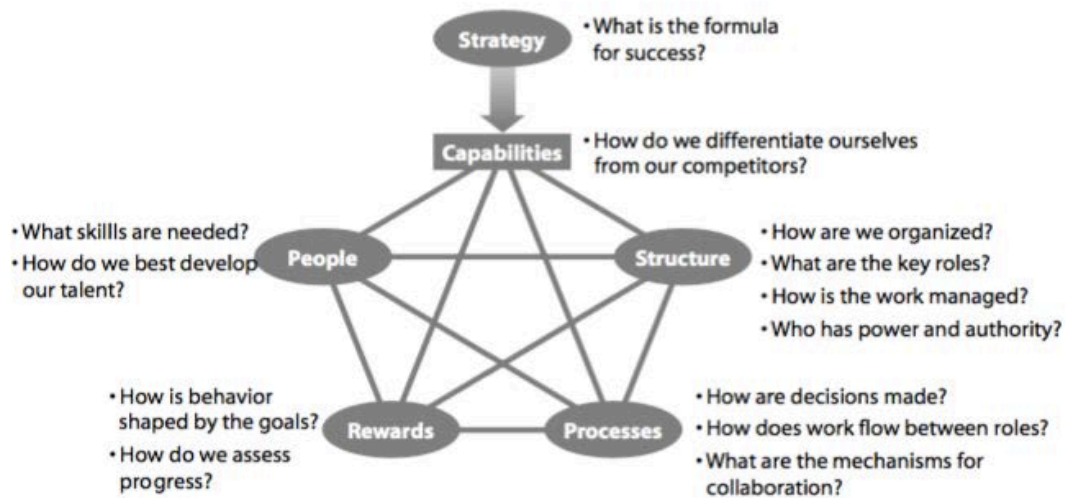


Figure 1. Star Model. Source: Kates & Galbraith (2007, p. 3).

D. RESEARCH OBJECTIVE

The objective of this research is to evaluate the deployment and implementation of the DHAs EHR, MHS GENESIS utilizing an organizational efficiency model. The star model is a framework for organizational design and consists of policies that are controlled by management and it may influence employee behavior (Kates & Galbraith, 2007). The organizational design policies fall into five categories or five points of a star. The design policies, or star points, are the following: strategy, structure, processes, rewards, and people. Strategy determines the direction of an organization, structure determines the location of decision-making power, and processes are related to the flow of information (Kates & Galbraith, 2007). The reward point of the star is reward systems

or policies that motivate personnel within an organization to perform and achieve organizational goals, and the people element of the model is related to human resource policies, which define and influence employee's skillsets and mindsets (Kates & Galbraith, 2007).

Kates and Galbraith (2007) challenge the traditional notion of matrixed organizations and imply that these organizations over emphasize the strategy and structural elements of the star model. In addition, they spend little effort on policies related to processes (business), rewards (motivation), and people (skillsets and mindsets). The star model is the foundational element of the thesis and evaluating the challenges and barriers of the EHR deployment across the MHS.

There are a multitude of researchers and healthcare specialists who have studied, evaluated, and researched EHR implementation and sustainment issues across healthcare organizations, and this research has a recurring theme. It is primarily focused on the inclusion of employees in the EHR adoption and deployment stages, EHR training, organizational strategy, and business processes. There is additional research on leadership issues and how organizational structure and leadership buy-in determines the final or successful outcome of an EHR deployment and adoption. The overarching theme is the great importance of people, or employees, and business processes within healthcare organizations in the research. These factors may determine the successful implementation and sustainment of an IT/information management (IM) platform such as an EHR. Additionally, there is little information on rewards or motivation systems and development of the skillsets of employees who utilize EHRs, and there is a lack of detailed information regarding EHR adoption and deployment strategy in an organization. These are possibly the most critical elements in the deployment and implementation of an EHR system. The lack of research on rewards within healthcare organizations, developing employee skillsets, and integrating and applying the prior research with the five points of Galbraith's star model as well as the development of an organization's overarching strategy leading up to the implementation of an EHR are the driving elements of this thesis.

It is the goal of the authors of this thesis to compile data from research journals, peer-review periodicals, and available organizational structure information (DHA private and public facing websites) to answer the research questions that are presented in the next section. This includes contributing to the field of healthcare, healthcare IT, and the Department of Defense (DOD) with new data and research from the authors. This new information, or reshaped information, may assist the DOD, DHA, and other healthcare organizations in the successful implementation of HIT systems and applications across a large enterprise in the future.

E. RESEARCH QUESTIONS

The following are three research questions posed by the authors of this thesis. The questions are explored and examined throughout this writing. Furthermore, the reader is exposed to and provided ample, highly informative, and up-to-date information regarding the identified topic area throughout the five chapters to make both an informed and accurate determination on each question posed.

1. How could an enterprise strategy contribute to the successful implementation of a large-scale enterprise resource planning (ERP) system such as the newly acquired EHR?
2. How could the gaps, or absence, in business processes, personnel development, and rewards systems prevent the successful implementation of an EHR?
3. How can DHA address the challenges associated with vertical and lateral processes to attain sustainment operations?

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II. LITERATURE REVIEW

Creswell (2009) stated that a literature review serves several purposes, and “it shares with the reader the results of other studies that are closely related to the one being undertaken” (p. 25). Additionally, the literature review “provides a framework for establishing the importance of the studies as well as a benchmark for comparing the results with other findings” (Creswell, 2009, p. 25). The authors of this literature review evaluated numerous peer-reviewed journals, research studies, and other publications related to the implementation and sustainment of electronic health records (EHRs) in healthcare organizations.

Specifically, the authors explored and examined five significant elements based upon the Galbraith star model for decision making, which enable large healthcare enterprises to construct an organizational framework for EHR systems. The five elements are organizational strategy (direction), structure (power), processes (information), rewards (motivation), and people (skillsets and mindsets). Furthermore, the authors provide readers with an increased awareness of the ongoing dialogue in the literature, and the current issues healthcare enterprises are confronted with regarding implementation and sustainment of an EHR system.

A. ELECTRONIC HEALTH RECORD

Several studies explored EHR systems and defined the purpose of the patient-based IT systems. The EHR and associated systems are a means for physicians and other clinical personnel, or medical providers, to manage patient care (Robichau, 2014). The EHR contains an electronic set of patient data associated with an individual patient and access spans across multiple healthcare providers (Robichau, 2014). EHRs are dynamic in nature and allow clinical personnel to utilize capabilities such as online access to patient charts and information (e.g., medical and family history, medication usage, radiological imaging), physician order entry, and other online resources available to individual patients. The EHR, or medical record, is the keystone of healthcare in the inpatient and outpatient settings, including pre-hospital and emergency medicine

environments (Bircher, 2010). Bircher (2010) stated that EHRs reduce patient risks (e.g., death or serious bodily harm) by openly sharing patient information in an electronic repository, and the EHR acts as a decision support system reminding medical providers to conduct additional tests, provide medications to patients, or notify providers of diagnostic criteria. This includes issuing an emergency alarm in the event a patient may be presented in a dangerous situation (Bircher, 2010). Moreover, EHRs and associated systems are an indispensable tool to clinical personnel in the fast paced, information saturated environments observed in the healthcare settings.

Gartee (2011) stated, “The idea of computerizing patients’ medical records has been around for more than 30 years, but only in the past decade has it become widely adopted” (p. 1). In the time prior, the EHR, patients’ medical records and related information was hand-written, or typed, and stored in paper-based file systems (Gartee, 2011). The use of patient record systems began early in the twentieth century at the Mayo Clinic in Rochester, Minnesota. Here, paper-based records were kept in file cabinets within each clinical area, and the records were organized in a manner similar to the public library system (Hobbs, 2016). The issue with these aged systems is that patient records were stored and located in different clinical areas within a hospital. One clinical area (e.g., cardiology) would be unable to share or display patient health information to another clinical area (e.g., orthopedics), which helps create an environment with minimal (at best) collaboration or information sharing (Hobbs, 2016). A physician would not be aware of or able to retrieve a patients’ medical history, medication use, or overall health status, thus creating a dangerous and life-threatening environment for patients undergoing care. A technological solution emerged—the EHR—out of the dangerous events and related conditions patients were exposed to under the paper-based record system. Today, the EHR is a vital component of hospital and information system management within a healthcare system, but it may be minimally realized by healthcare systems (Bircher, 2010).

Although the EHR is a relatively new technology and has issues in the healthcare setting, it offers a technological solution to assist physicians, nurses, and other healthcare providers in accomplishing the required daily task of treating and caring for patients with

more ease than observed in the past. The EHR adoption and uptake was relatively slow with only nine percent of healthcare systems adopting EHR technologies in 2009 (see Figure 2) (Hobbs, 2016). By 2015, more than 90 percent of healthcare systems had acquired certified EHR technology and related systems (see Figures 2 and 3) (Health IT Dashboard, n.d.).

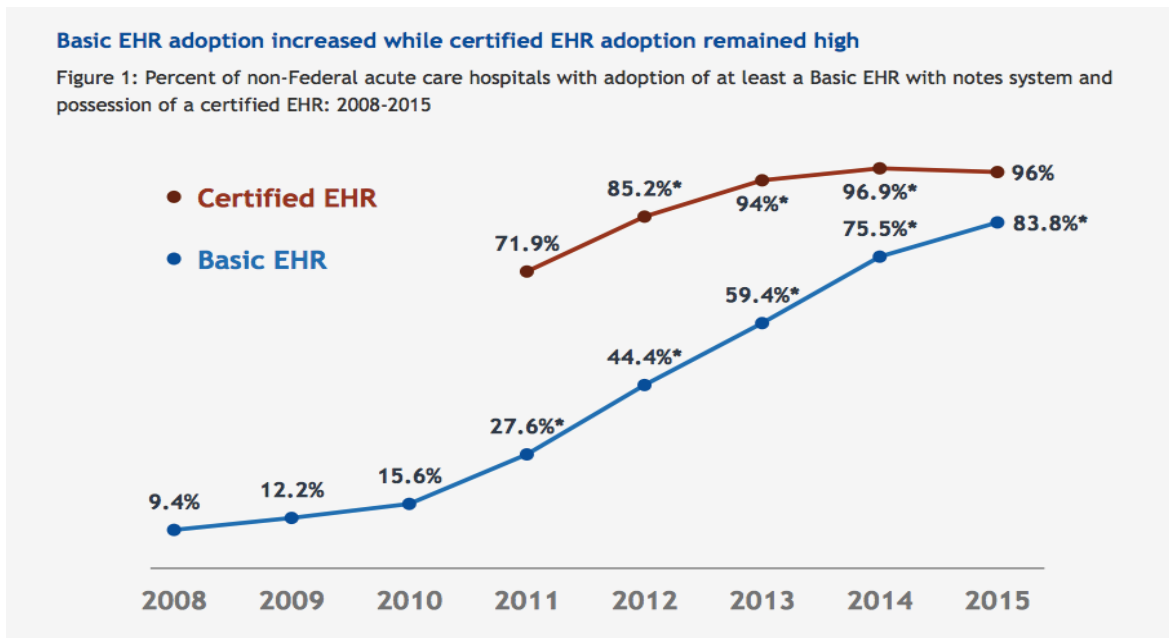


Figure 2. EHR Adoption in the United States. Source: Health IT Dashboard (n.d.).

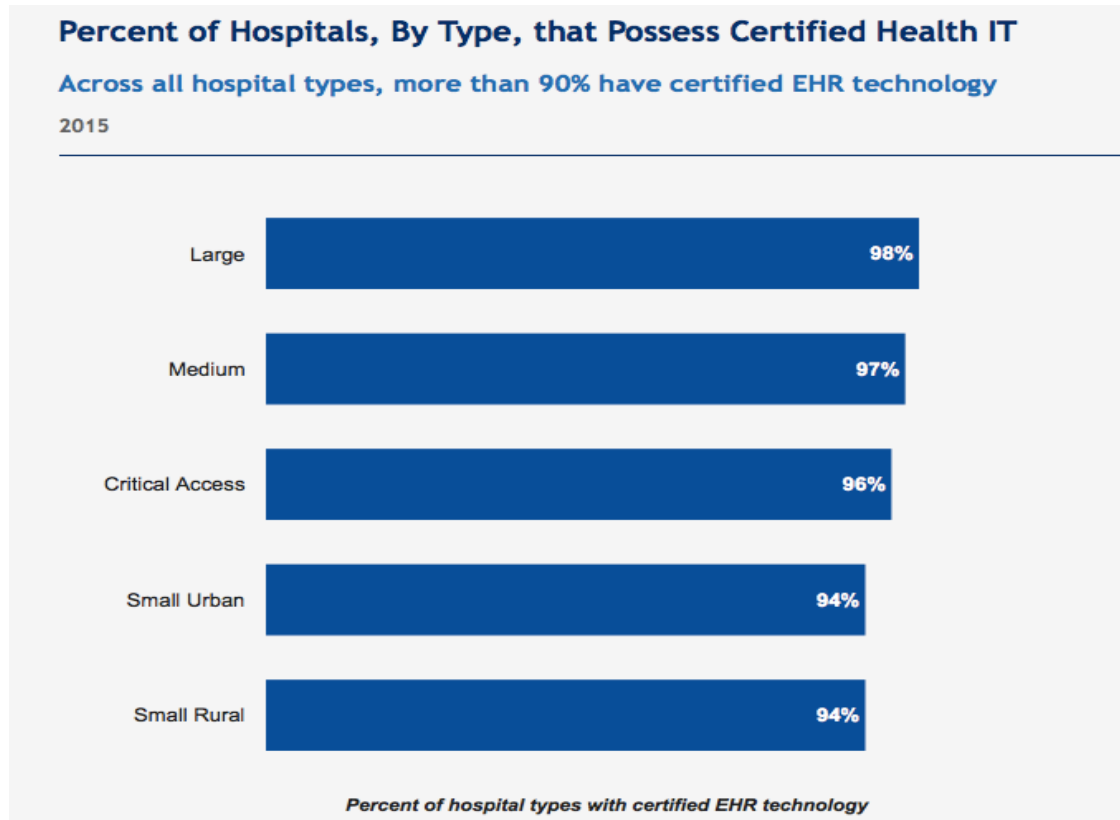


Figure 3. Percent of Hospitals with Electronic Health Records and Health IT.
Source: Health IT Dashboard (n.d.).

The increased adoption rate observed in Figures 2 and 3 is attributed to the 2009 federal mandate prompting EHR adoption, and the relative time it took U.S. healthcare systems to realize the potential and measurable benefits of EHRs. Several EHR benefits are: increased patient safety, elimination of or reduced medical errors, reduced healthcare costs for facilities, and the ability to create metrics to measure performance (Haugen & Woodside, 2010).

Although, EHRs are a revolution in the medical and IT fields, they do come with several drawbacks. The EHR systems are expensive to implement, poorly designed EHR systems are cumbersome to end-users, and the records expose protected patient health information on computer networks connected to the Internet. This includes breaches of patient record information (see Figure 4) and other information security issues that violates federal statutes like the Health Insurance Portability and Accountability Act

(HIPAA). These issues will arise with the advent of new and emerging e-health technologies and will require both government and non-government hospital systems to address them in their strategic and operational plans. Nonetheless, EHR systems are a very effective and efficient means to delivering high quality, patient focused care to patients in need of medical treatment in any healthcare setting, and they are a necessity in today's dynamic, fast-paced, and IT-based healthcare environment.

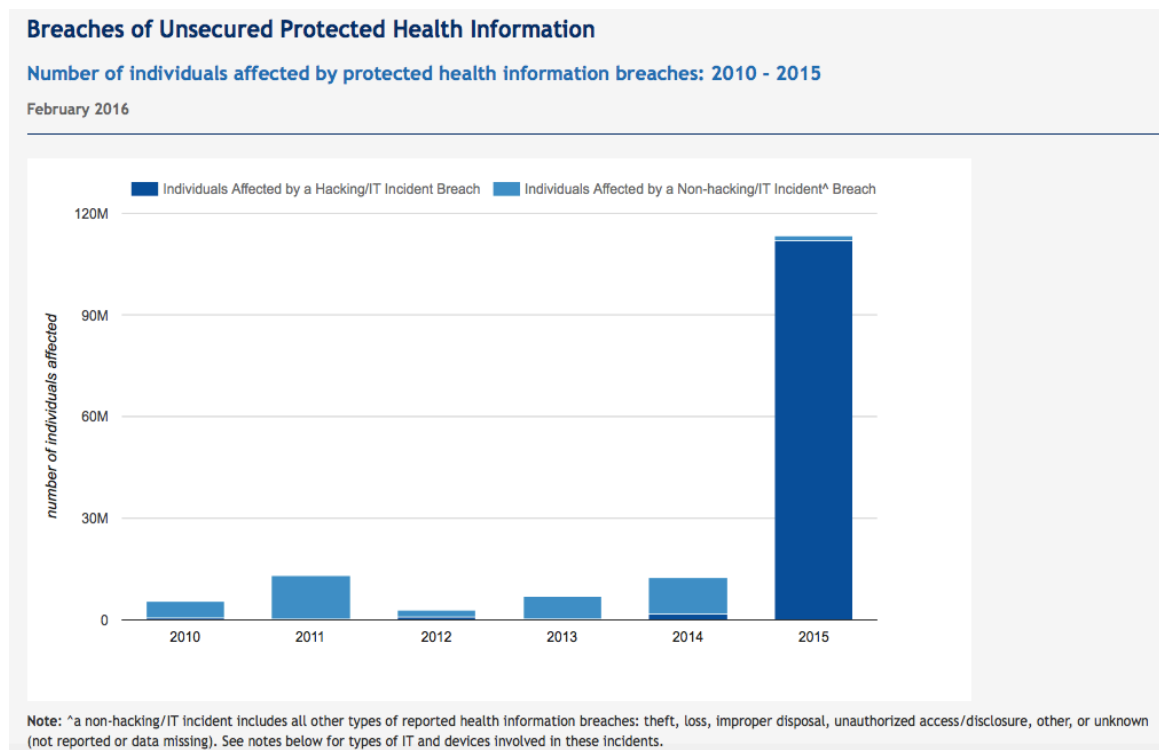


Figure 4. Breaches of Protected Health Information. Source: Health IT Dashboard (n.d.).

B. STRATEGY—DIRECTION

Kates and Galbraith (2007) stated an organization's success is dependent upon its strategy—its **direction**. Strategy is a derivative of several factors. The first factor is senior leaderships understanding of four business areas: competitors, suppliers, customer bases, and new technologies. This understanding, coupled with an awareness of an organizations strengths and the relationship it has to these business areas, is paramount in

the formulation of an organizational strategy. The second factor is attaining distinguishable, internal organizational capabilities (Kates & Galbraith, 2007). Organizational capabilities, defined by the authors, are “the unique combination of skills, processes, technologies, and human abilities that differentiate a company” from others (p. 6). These capabilities are created internally and difficult to replicate, and the goal of organizational design is to create these capabilities to gain an advantage (economic, competitive) (Kates & Galbraith, 2007). An organizational strategy is instrumental in the formulation of an organizations design, and it is the key ingredient for an organizations success.

A content analysis by Standing and Cripps (2015) explored the critical success factors (CSFs) that lead to the successful implementation of an EHR. The authors contend that CSFs are not only a means to improve an IT systems success, but they are also related to organizational and IT project success. Strategy is the linkage to CSFs and the implementation of an EHR. The most prevalent CSFs discovered by the study included, but is not limited to, senior leadership and stakeholder involvement in strategy formulation and communication of the organizations strategy to employees (Standing & Cripps, 2015). Committed leadership is essential to an organization achieving its goals and objectives, and creation of a vision (strategic) is an organizational imperative in the implementation of any related e-health technology.

In addition, a strategic emphasis must be placed on workable, operable system—not a system that is flawless (Standing & Cripps, 2015). The movement toward a flawless system within an organizational strategy will lead to paralysis (strategic and organizational) and must be avoided (Standing & Cripps, 2015). Senior leadership in organizations must be cognizant of the CSFs, the context they work in, and how the CSFs change over time, the overarching strategy and strategic approaches needed to be developed to overcome barriers to EHR implementation (Standing & Cripps, 2015).

Dr. Louise Liang, the architect, of Kaiser Permanente’s EHR (KP Health Connect) that positively impacted over nine million healthcare recipients, offered insight into strategic development in the book *Connect for Health*. Healthcare organizations that make strategic investments need to formulate a strategy at the beginning of a significant

technology implementation project (Liang, 2010). This includes adherence to the objectives and goals set forth by senior leadership. Liang added the key to a successful strategy is achieved through the support of senior leadership and physician executives. This was accomplished through the *Blue Sky* vision at Kaiser Permanente, and the Blue Sky vision included an executive body that was tasked with developing strategic themes and principals. The themes outlined by the Blue Sky team were to develop homes as a healthcare setting, integrate medical services, secure transition of patients' health record information, and customize of medical services (Liang, 2010). The selected principals of the Blue Sky team were the following: utilize common platforms, processes, and services; acquire an established EHR and do not develop a custom EHR product; integrate IT applications; applications are acceptable (or successful) if it meets 80 percent of Kaiser's needs; and customers or end users must lead the project and be supported by IT personnel (Liang, 2010). These themes and principals were the foundation of the strategy employed by Kaiser Permanente and led to the successful implementation (and the largest for non-government) of an EHR.

Several studies demonstrated a correlation between senior leadership (executive) commitment, communicating a strategic vision, and the successful deployment of an ERP system, such as an EHR. There is a strong consensus that top leadership support, engagement, and commitment are the key factors to an organizations strategic success or failure with an EHR or ERP system (Nair, Reddy, & Samuel, 2014; Reiner, 2012; Murphy, 2011; Muscatello & Chen, 2008).

Haugen and Woodside (2010) discovered four components of an EHR system and its adoption in their research. The primary component of its implementation is the organization's strategy, which is critically dependent upon engaged leadership (Haugen & Woodside, 2010). Furthermore, it is the senior leaders "will make or break the effort" of an EHR deployment strategy and its adoption, and they need to be held accountable for communicating transparently (Haugen & Woodside, 2010, p. 44; Murphy, 2011). Lastly, it is the senior leaders' responsibility to create and articulate an effective strategic vision that encompasses the end-state of the healthcare organization (Murphy, 2011; Reiner,

2011). Senior leaders' commitment and articulation of a strategic vision are vitally important in the promulgation of an organization's strategic imperatives.

Trkman (2010) suggested in the *Journal of Information Management*, "Implementing change within an organization is dependent on the quality of the implementation process" (p. 130). A key success factor in an organizations strategy and its success is understanding the importance and application of senior leaders' involvement within an organizational strategy. There are many stages in the pre-implementation phase of an ERP in which senior leaders' involvement is lacking, missing, or incoherent at all levels of the organizational.

In Trkman's (2010) *Business Process Reengineering* evaluation, he discusses effective organizations that demonstrate *quick wins* to invoke buy-in from employees and work units within the organization. A quick win is a motivational approach; it provides senior leaders measurable results, provides a medium for feedback (positive) to middle management, and through it, lower level employees may observe unsubstantial rewards. A demonstrated quick win may be an effective tool for work unit and employee buy-in with regards to strategy implementation and effectiveness.

C. STRUCTURE—POWER

According to Kates and Galbraith, "An organization's structure determines where formal power and authority are located" throughout a work center (2007). Typically, work centers or work units are developed around products, location (or geography), or functional areas (Kates & Galbraith, 2007). In addition, the work units are configured into a hierarchal structure for organizational decision making and management. Moreover, the structure is vitally important in the organizational design process.

Any misalignment of an organizational structure inhibits an organization from achieving its strategic objectives, goals, and milestones. Kates and Galbraith (2007) further stated that an organizational structure establishes the reporting relationships, communication channels, and **power** distribution. The structure determines what work unit will come into contact with whom, and it identifies what work (or projects) is important to an organization. Structure is a means of achieving an organization's

overarching strategy, and it identifies the work center, or entity, that will execute its strategic imperatives.

A study by Weill and Ross (2009) evaluated operating models (structures) and key leadership roles in an IT-based organization. They offered readers four operating models, and they identified the key roles in what they coined *IT savvy firms*. The four operating models (see Figure 5) offer senior leadership a means to develop an organizational structure that aligns with strategic imperatives. Moreover, the models that an organization may utilize to build an effective ERP are based upon shared services, shared data, standardized technologies and processes, or a combination of the three (Weill & Ross, 2009).

Business Process Integration	High	Coordination <ul style="list-style-type: none"> Shared customers, products or suppliers Impact on other business unit transactions Operationally unique business units or functions Autonomous business management Business unit control over business process design Shared customer/supplier/product data Consensus processes for designing IT infrastructure services; IT application decisions are made in business units 	Unification <ul style="list-style-type: none"> Customers and suppliers may be local or global Globally integrated business processes often with support of enterprise systems Business units with similar or overlapping operations Centralized management often applying functional/process/business unit matrices High-level process owners design standardized process Centrally mandated databases IT decisions made centrally
	Low	Diversification <ul style="list-style-type: none"> Few, if any, shared customers or suppliers Independent transactions Operationally unique business units Autonomous business management Business unit control over business process design Few data standards across business units Most IT decisions made within business units. 	Replication <ul style="list-style-type: none"> Few, if any, shared customers Independent transactions aggregated at a high level Operationally similar business units Autonomous business unit leaders with limited discretion over processes Centralized (or federal) control over business process design Standardized data definitions but data locally owned with some aggregation at corporate Centrally mandated IT services
		Low	High
		Business Process Standardization	

Figure 5. Four Operating Model Choices. Source: Ross (2005).

Strategy offers minimal direction for the development of stabilized IT and business capabilities, and an operating model is the organizational solution, or proactive approach, to creating value from IT (Ross, 2005). As Ross (2005) stated, “an operating model is the necessary level of business process integration and standardization for delivering goods and services to customers” (p. 1).

The four models that enable organizations to deliver services or goods are the following: diversification, unification, coordination, and replication (in Figure 5). Diversification (low standardization, low integration) is a decentralized organizational structure, or design, and it involves creating an IT platform of shared services, which assist autonomous work units (Ross, 2005; Weill & Ross, 2009).

The unification (high standardization, high integration) model is a centralized organizational structure, and it includes a platform of standardized business process and technologies (Ross, 2005; Weill & Ross, 2009). Coordination (low standardization, high integration) focuses on organizational integration, and it includes a standardized IT platform of shared data that supports managerial decision making or acts as single point of contact for customers (Ross, 2005; Weill & Ross, 2009). Replication (high standardization, low integration) is reliant on process standardization, and it consists of a platform of standardized processes and technology for a common brand and its definition within an organization (Ross, 2005; Weill & Ross, 2009). Organizations need to identify and select a single operating model to guide senior and management teams thinking and system implementation across the organization or enterprise (Ross, 2005).

It is the responsibility of executive leadership to select the operating model that meets the requirements and (future) capabilities of the organization. The key roles in an IT savvy firm are the chief executive officer and senior business leaders, chief information officer and senior IT managers, strategy execution officer (or process owners), business unit leaders, and project leaders (Weill & Ross, 2009). These key roles are responsible for articulating and clarifying the operating models design, communicating transparency, establishing requirements and capabilities, and implementing project, change, and business processes (Weill & Ross, 2009). It is important to select an organizational structure and thoroughly develop and establish the roles within in an IT organization to an ERP system (or EHR) becomes a strategic asset and not a liability.

Sutton and Rao (2014) revealed that the decade before 2002, Kaiser Permanente experienced numerous failed attempts to deploy and implement an EHR system. The pivotal point was when Kaiser's senior leadership realized the organizational structure

needed to depart from its history of IT customization and the regional silos that operated independently as business units (Sutton & Rao, 2014). Kaiser Permanente required a solution to the *silo effect*.

The silo effect is widespread in healthcare organizations due to the landscape of the groups of employees (e.g., physicians, nurses, administrators) with unequal status and power in the workplace (Kreindler, Dowd, Star, & Gottschalk, 2012). Kaiser implemented Tiger Teams across its eight regional areas to address this issue and to assist sites in the deployment of the EHR solution by providing personnel, training, and funding (Sutton & Rao, 2014; Liang, 2010). In addition, Tiger Teams were implemented to create a space for senior leadership “to develop new ways of working with the regions and new problem solving processes” within the organizational structure (Liang, 2010, p. 29). In conclusion, the Tiger Teams were instrumental in cultivating a culture of collaboration and bridged the gaps in the organizational structure while empowering the front-line supervisors (the most critical positions) to assist in the integration of the EHR into the healthcare facility workflows (Sutton & Rao, 2014; Liang, 2010).

D. PROCESSES—INFORMATION

Kates and Galbraith (2007) discovered that structure and strategy in complex organizations create barriers to collaboration and requires a solution to bridge the internal boundaries while integrating work activities. The pathway to solving these barriers is the implementation of business processes and lateral connections. Kates and Galbraith explain, “Processes and lateral connections provide the required mechanisms of integration” (2007, p. 17) (see Figure 6).

Continuum of Lateral Connections.

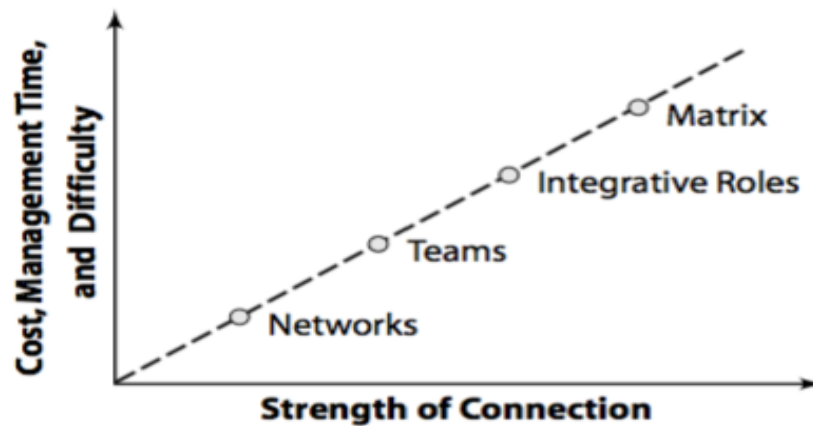


Figure 6. Lateral Connections Continuum. Source: Kates & Galbraith (2007).

The term process, according to Kates and Galbraith (2007), refers to organizational activities that move information up, down, and across organizations. Processes cross boundaries, carrying the required information to make decisions, and they force work units within an organization to work together to achieve goals and objectives (Kates & Galbraith, 2007). Furthermore, the design of the processes and lateral connections plays a significant role in the organization. For instance, process and lateral connection design determines how well the work units work together (vertically or horizontally), and they are the primary means to coordinate activities (Kates & Galbraith, 2007). Processes and lateral connections (teams, networks, and integrated roles) that are optimally designed remove the barriers to collaboration and enable organizations to progress toward their strategic vision.

Anderson and Anderson (2010) identified that successful change leaders must view their organizations as a multi-dimensional and interconnected living system. As organizations are always in constant motion, change must be managed using business processes that allow leaders to instrumentally guide the flow of the change process. With these changes affecting both internal and external work units, employees at all levels of an organization in the change process must be proactively involved. Organizations need

to understand that each organizational change, or process change, has an effect on both action originators (change management team and work unit) as well as those receiving the benefits of the process. Furthermore, it allows change management personnel to make adjustments that benefit both parties.

This level of thinking is consistent with the methods described by Anderson and Anderson (2010) within the conscious change leader accountability model. The authors of the model stated that all levels and types of action within an organization need to be addressed as each has a direct influence on the change process (Anderson & Anderson, 2010).

A study by Ajami, Ketabi, Isfahani, and Heidari (2011) assessed the readiness of EHR process implementation through a textual analysis. The authors cited four areas related to EHR readiness, and they posit operational readiness is the area involving EHR business processes (Ajami et al., 2011). Operational readiness for healthcare facilities in the context of EHR processes includes the following components: work design or redesign; EHR policies, procedures, and related protocols; training plans; and business process training programs for project management teams and IT staff. Healthcare organizations that are prepared in the aforementioned areas will be able to identify process barriers during implementation and provide guidance to its personnel in an effort to adopt an EHR successfully. A “lack of readiness causes [organizational] weaknesses” within business process design and hinders the transformation of an organization during EHR implementation (Ajami et al., 2011, p. 226). EHR process design, policies, procedures, and related process training are crucial factors in EHR implementation across healthcare organizations, and they have dramatic effect on the transformation process that occurs with the implementation of a large ERP system.

An analysis accomplished by Muscatello and Chen (2008) revealed a correlation between business process improvement and ERP success. Large ERP systems, such as an EHR, require engineering and reengineering of business processes (prior to and during implementation). Organizations focused on business process activities enable work units to identify and improve critical operations, restructuring non-value added operations, and eliminating ineffective processes (Muscatello & Chen, 2008). Reengineering needs to be

undertaken to ensure strategic goals and objective are attained by an organization (Muscatello & Chen, 2008).

There is a goal, or end state, with reengineering business processes. The reengineering efforts undertaken by organizations need to create a uniformed response from all work units that ensure strategic goals are feasible, and “when goals are common, improvement becomes a shared task” (Muscatello & Chen, 2008, p. 66). A homogenous vision of business processes through process reengineering removes uncertainty in organizations (Muscatello & Chen, 2008). Not only are business process engineering and reengineering vital to the success of organizations utilizing ERPs, they are keystones to organizational design.

One study by Weill and Ross (2009) shared an anecdote with their readers regarding a \$125 million IT business process standardization project at Campbell’s Soup Company. The project was referred to as *Project Harmony*, and its goal was to standardize and integrate core business processes across 22 business units located around the globe. The management team at Campbell’s identified two significant challenges with Project Harmony, process design and process adoption by business units (Weill & Ross, 2009). The senior leadership team on Project Harmony recognized these challenges and barriers (process design and personal behaviors) to process adoption, and they created new roles and lines of accountabilities for key leadership in the business units. This included, but was not limited to, the CEO, chief financial officer (CFO), president of Campbell, and vice-president for global supply who were charged with the responsibility of overseeing and executing the IT project, deployment teams, and operating (process) committees (Weill & Ross, 2009). Harmony’s success was attributed to the centralization of the executive team, which enabled the executives to oversee, manage, and be accountable to the business unit processes.

E. REWARDS—MOTIVATION

Kates and Galbraith assert, “Rewards align individual behaviors and performance with the organization’s goals” (2007, p. 21). Reward systems fulfill three functions in large organizations. These systems communicate what the organizations value, **motivate**

employees in work units, and reinforce behaviors, which add value to an organization. Rewards come in the form of bonuses, salary increases, recognition, and other benefits. In addition, Kates & Galbraith (2007) stated there are challenges with these systems, and the challenge is designing a system of rewards that incentivizes and reinforces collaborative behaviors. Organizations must avoid rewards systems based solely on bottom-line measures and variable compensation, which hinders cross-unit coordination and collaboration efforts within work units (Kates & Galbraith, 2007). It is essential for large organizations to develop a robust rewards system for employees to ensure collaboration and organizational success is achieved.

In the book titled, *Managing and Using Information Systems*, the authors discussed incentives and rewards systems. Incentive and reward systems are a means for an organization to cultivate and encourage optimal performance from employees (Pearlson & Saunders, 2013). Information systems (IS) have a positive effect on and assist in the design of complex rewards systems. Additionally, organizations use websites to identify top performers and award winners on internal and social networks, track and monitor contributions of work units, and utilize quantitative data (metrics) in the assignment of compensation and rewards (Pearlson & Saunders, 2013). Furthermore, large organizations must evaluate both qualitative and quantitative data in rewards systems when providing incentives and rewards to its employees to ensure optimal performance is achieved.

A case study evaluation completed by Standing and Cripps (2015) identified a plethora of critical success factors (CSF) in EHR implementation. One unique CSF is related to user management in healthcare organizations. User management is the means to obtaining acceptance of a new EHR system and work practices. The method to increase collaboration and partnership, or user management, is to provide financial incentives to clinical and hospital personnel through a rewards system (Standing & Cripps, 2015). Additionally, the authors identified financial incentives as one of the key elements that led to project success with an EHR implementation. Rewards systems are paramount in the successful implementation and sustainment of EHR systems in the healthcare sector.

F. PEOPLE—SKILLSETS AND MINDSETS

According to Kates and Galbraith (2007), the people dimension of an organizational design in their research involved the evaluation of human resource practices and policies for the staffing, selection, development, and training of employees. Human resource practices and policies assist in the formation of the capabilities, mindsets, and skillsets within work units, which is necessary to execute strategic goals and objectives. In addition, complex organizations require leadership teams to leverage employees and work units in an effort to gain a competitive advantage (Kates & Galbraith, 2007).

It is imperative for leadership teams and employees alike to have the following skillsets and mindsets to execute the organizational strategy: exceptional interpersonal skills; build networks and relationships within informal channels; make decisions based on limited or ambiguous information; evaluate and weigh multiple perspectives within work units; and have the ability to interact and collaborate across work unit borders without conflict (Kates & Galbraith, 2007). Furthermore, it is highly important for senior leadership to implement policies to enforce the mentioned skillsets and mindsets while concurrently building and cultivating an environment that produces work unit leaders and employees with these characteristics.

An article authored by Lawson and Price (2003) addressed the psychology of change with employees in large organizations. A key attribute for changing the mindset of employees, as the authors cite, is that employees would have to observe the point of the change within the work unit and agree with it. Rewards and recognition systems must also align with the new behavior, and it is critically important to change employee attitudes towards the impending change in an effort to foster compliance (Lawson & Price, 2003). Higher success rates in organizational change approaches within work units and employees are attributed to having a purpose to believe in and proactive, positive role models that foster change (skillsets and mindsets) of employees and work units.

Several researchers have critically evaluated EHR training and employee development and its demonstrated efficacy in healthcare organizations. EHR training for

employees is vitally important to its success in both adoption and implementation. For example, Liang (2010) stated EHR training needs to include all hospital departments (clinical and non-clinical units), and it needs to be user focused opposed to system focused. Users will experience cumbersome learning curves with EHR training, but these may be mitigated through employee training and development by use of learning seminars, orientation training, and feedback systems (Hobbs, 2016).

Furthermore, training needs to focus on the end-users' needs and demonstrate how the system assists end-users to work more efficiently and effectively (Liang, 2010). This may be one of the most arduous tasks in employee training and development, but it is one of the key factors in employee buy-in and adoption. Training and organizational (human resource) policies and practices create positive behaviors and attitudes that cultivate a milieu of acceptance and adoption, but this is not attained without the diligent work efforts from senior leadership (Robichau, 2014).

A study by Lubitz (2010) evaluated the use of training, development, and leadership teams in healthcare operations. Lubitz argues, "Training alone is not sufficient" for meeting the demands and required services of a healthcare delivery organization; the training in a healthcare setting must be anchored in active learning within the context of team and leadership development (2010, p. 159). It is critical to develop and train high performing teams and leaders in an experiential versus didactic approach in the learning process design. High performing teams are a critical element in the learning process in healthcare operations. In addition, healthcare organizations need to develop leaders and associated teams in an environment that is based upon a foundation of high quality professional attitudes, skills, and knowledge (Lubitz, 2010). Moreover, training and development of leadership teams and associated employees are indispensable in the execution and delivery of healthcare operations.

In the book, *Beyond Implementation* (Haugen & Woodside, 2010), the authors discussed training and development of healthcare personnel prior to EHR implementation. The authors cited four prescriptions for organizational success: train clinical personnel in a new way (demonstrate how process and technology exists to improve an end-users experience); train end-users to achieve a high level of proficiency

with the EHR; develop an environment wherein users may practice and gain experience with the EHR system using patient scenarios; and establish a baseline of proficiency and knowledge (including confidence) that end-users may achieve (Haugen & Woodside, 2010).

It is these areas that organizational policies and procedures, senior leadership, training teams, and vendors need to focus on for the development of end-users in healthcare facilities with EHR systems. These prescriptions are a means to spur a training and development renaissance in organizations adopting EHR systems, and they ensure the EHR system is retained and optimally utilized by employees through its lifespan.

G. SUMMARY OF LITERATURE REVIEW

The literature review presented by the authors shared with the readers the results of other studies closely related to this thesis in an effort to increase awareness of the ongoing dialogue in the literature and the current organizational issues related to EHR systems. The primary purpose of the review was to establish the importance of other studies and utilize the findings within those studies as a benchmark for comparing future results. The authors explored and presented information from peer-reviewed journals, research studies, and other publications related to the implementation and sustainment of EHRs in healthcare organizations. Specifically, based upon the Kates and Galbraith (2007) star model for organizational design and frameworks, the authors explored and examined five significant elements within five sections: strategy, structure, processes, rewards, and people.

Senior leaders' ability to communicate a strategic vision, maintain engagement and commitment throughout the process of implementation is a key success factor. Additionally, senior leaders' understanding of their roles within the change process and how strategy, structure, processes, rewards, and people impact the organization's adoption of an EHR system will afford an organization the opportunity to successfully execute its goals, milestones, and objectives during implementation. Kates and Galbraith (2007) placed considerable value in the staffing and selection of personnel, both of which have specific attributes to create an environment that is designed to implement and

promulgate change in an organization. Leadership (senior and executive) involvement is paramount at all levels of an organization for the successful implementation of any e-health technology (Standing & Cripps, 2015). Critical success factors (CSF) vary from MTF to MTF, but senior leadership must remain cognizant of the changes that allow strategic initiatives to evolve positively as implementation occurs.

The definition of processes are organizational activities moving information up, down, and across organizations (Kates & Galbraith, 2007). Kates and Galbraith offered a framework for an organization to make implementation and sustainment strategies transparent to the employees, and work units, delivering healthcare. With clear guidance and organizational direction, the DHA will harness its multi-dimensional, interconnected, living system and positively direct change according to the abilities and capabilities of its employees.

Financial rewards within the implementation phase of the EHR deployment phase are (most likely) not built into appropriated budgets. Kates and Galbraith (2007) stated that the rewards communicate value, motivate employees, and reinforce positive behaviors, thereby in return, adding value to the organization. Having the ability to track performance metrics enables organizations to implement one of these performance based incentive programs throughout the implementation and sustainment project phases.

During EHR implementation, training for the EHR adoption is a key attribute to the project's success; it is the sole attribute that leads to successful adoption of an EHR system. A user-focused EHR system allows an organization to address user needs (and patients' needs), thus gaining buy-in and a positive attitude (skillsets and mindsets) from employees and work units (Liang, 2010). Physician executives offer a unique perspective to the use of DHAs newly acquired EHR. This group of medical leadership, or physician executives, understands the application of e-technology across the enterprise having once been end-users. Users within a healthcare setting are part of a team, and team building offers an opportunity in leader development within healthcare organizations. Harnessing the experiential based capabilities within a healthcare organization offers an indispensable training capability that emphasizes high quality professional attitudes, skills and knowledge (Lubitz, 2010). EHR training must remain consistent with current

technologies and technical capabilities of its end-users while demonstrating the positive effects within the work unit—patient and end-user benefits. Haugen and Woodside (2010) suggested that following a well-round, robust training process will ensure EHR systems are retained and optimally utilized by employees throughout their lifespan.

The implementation of change within an organization is solely dependent on the organizational design and implementation processes (Trkman, 2010). The thesis authors conclude that given the current state of DHA's EHR implementation and MTFs response to the initial phase of deployment, there is need to recalculate and reorganize the deployment plan to attain a more consistent design and pathway forward that aligns with Kates and Galbraith's star model.

III. METHODOLOGY

A. RESEARCH DESIGN

Creswell (2009) cited that a qualitative research design is a proposal, or plan, to conduct social research. The research design consists of three significant components. The components “involve the intersection of philosophy, strategies of inquiry, and specific [research] methods” or procedures (Creswell, 2009, p. 5). In this study, the authors chose a social constructivist worldview, case study strategy of inquiry, and several data gathering methods to assist in the formulation of the study.

The authors of this study examined two medical treatment facilities (MTFs) of varying size within Navy Medicine West undergoing the upgrade to the newly acquired EHR. The MTFs were selected by the authors to identify any barriers or challenges in the organizational environment and approach with the implementation of the EHR based upon the application of the Galbraith’s star model, which is utilized to solve organizational design challenges. The star model is a means to effectively evaluate an organization’s approach to implement a product, such as the EHR. Furthermore, it enabled the authors to collect and explore information related to the research questions posed for this study. The research questions, as stated in Chapter I, are:

1. How could an enterprise strategy contribute to the successful implementation of a large-scale enterprise resource planning (ERP) system such as the newly acquired EHR?
2. How could the gaps, or absence, in business processes, personnel development, and rewards systems prevent the successful implementation of an EHR?
3. How can DHA address the challenges associated with vertical and lateral processes to attain sustainment operations?

1. Philosophy

The **social constructivist** worldview is utilized in qualitative approaches and holds the assumption “that individuals seek understanding of the world in which they live and work” (Creswell, 2009, p. 8). Individuals develop meanings of their workplace

experiences, and researchers address the processes in social interactions and “interpret the meanings others have about the world” (Creswell, 2009, p. 8). Moreover, researchers generate a theory or patterns of meaning based upon the data collected in this worldview (Creswell, 2009). This inductive approach is important in evaluating the implementation and sustainment of EHR systems as it affords the authors an opportunity to inductively develop a theory (if any) and identify patterns derived from the data and associated research materials.

2. Qualitative Strategy

Creswell explains, “Case studies are a strategy of inquiry in which the researcher explores in depth a program, event, activity, process, or one or more individuals” (2009, p. 13). This includes the description of a workplace setting and allows researchers to identify themes or issues in the data collected (Creswell, 2009). The **case study** approach is the ideal approach to explore and evaluate the activities, events, and processes related to EHR implementation and building an organizational framework for a large government organization, such as the DHA. In addition, it will answer the stated research questions, identify any organizational problems and the importance of problems encountered in the EHR project, and it will contribute to the field of social research in health information technology.

3. Data Gathering Methods

There were two data gathering, or collection, types utilized by the authors. The first gathering type was a **textual analysis** of over 45 documents, including peer-reviewed journals and publications, and visual materials acquired through DHA (non-public and public) websites and IT leadership in Navy Medicine West and DHA. The documents included, but are not limited to: minutes from DHA infrastructure and operations quarterly meetings, newspaper articles, peer-review journals, and other EHR related publications, EHR project timeline and configuration management presentations, and emails regarding project timelines and status of EHR deployment schedule. The authors also examined the private and public documents while conducting a cross-

sectional evaluation of the star model in conjunction with the interview participant questionnaire information.

The second gathering method were unstructured, open-ended **interviews** conducted face-to-face (see Appendix A for transcripts) at two MTFs and through email with Navy Medicine West and DHA personnel involved with and privy to the EHR system and its deployment and implementation. Group interviews were conducted between March and June 2016 at the two sites and via electronic means with other Navy medicine personnel. The interviews focused on the five elements of the star model and its application within the deployment and implementation process at the MTFs. Participants included IT staff, chief information officer (CIO), IT department managers/supervisors, and IT technicians at the MTFs. The participants offered a wide breadth of information related to the EHR, MTF (or site) issues related to deployment and implementation, and DHA organizational approaches to the implementation of the EHR system. MTF IT staff and technical personnel, or employees, were asked the following questions:

1. What is the current network footprint of the organization?
2. What clinical areas does the organization support with the EHR currently in use? Future EHR use?
3. Are there any areas that will be gained (or lost) by implementing the new EHR product?
4. What is the organizations EHR deployment timeline?
5. What is DHA offering as deployment and implementation assistance?
6. Are there additional resources required to meet the minimum technical specifications of the EHR product? Were these specifications briefed to the IT staff at the MTF?
7. How many users utilize the current EHR system? Are the end-user numbers going to change with the new EHR product?
8. Are there any lifecycle issues, or other technical issues, foreseen with regards to the sustainment of the new EHR product?
9. Do you have anything else to add regarding the EHR project?

IT personnel and staff selected for interviews at the MTFs were involved or played a significant role in the EHR deployment and implementation. Other MTF leadership (commanding officer, unit directors, etc.), clinical personnel, and patients were not interviewed because they were not privy to the DHA EHR deployment and implementation strategy and processes. This research focused primarily on the exploration of the strategy, structure, processes, rewards, and people (skillsets and mindsets) for information technology and management personnel intimately involved with the EHR product termed MHS GENESIS.

There are limitations to research designs, including qualitative research designs. Researchers, and the authors of this thesis, must identify and be cognizant of the reflexivity of their biases, personal backgrounds, values, and norms (Creswell, 2009). This includes, but not limited to, ethical and moral issues related to conducting interviews and analyzing the data. The role of researchers is highly dependent upon the objectivity of their findings and conclusions within a research project or study. Any deviation from objectivity negates the true nature of qualitative research and undermines the research process, which is to thoroughly explore and explain a social phenomenon or concept with an academic lens. Additionally, qualitative researchers must be highly cognizant of the concepts of reliability, validity, and generalizability. This means checking for accuracy of the findings by employing social research procedures and ensures the approach is consistent throughout the entire research process (Creswell, 2009). The researchers of this thesis are aware of the limitations and explain issues that may arise throughout the thesis sections.

B. RESEARCH APPROACH

The research approach and associated methods contribute to the research design and tend to be quantitative, qualitative, or mixed (Creswell, 2009). The authors of this thesis have chosen a qualitative approach. A phenomenon or concept that “needs to be understood, because little research has been done on it, then merits a qualitative approach” (Creswell, 2009, p. 18). The qualitative approach is exploratory, and it addresses a topic within a group of people who have not experienced a particular

phenomenon or issue (Creswell, 2009). In this writing, the authors chose to address the EHR implementation and deployment issues confronted by a large government healthcare organization (DHA) undertaking this enormous task through a social constructivist lens.

A great amount of research has been conducted in the areas of EHR implementation, as in the instance of Kaiser Permanente, but there are what Creswell (2009) coined as “deficiencies in past literature” and research (p. 106). This means particular research topics have not been addressed or replicated in previous research studies. These deficiencies are interpreted as a “suggestion for future research” (Creswell, 2009, p. 106). The authors of this thesis are addressing the deficiencies in previous research through the exploration and application of the star model with the DHA. Previous researchers and organizations have not explored, nor have they attempted to apply, an organizational efficiency model, which holistically evaluates and applies the five points of the star model, in a large government organization, such as the DHA. The most impressive implementation and deployment of an EHR that is related to this topic area is the Kaiser Permanente deployment and implementation of the EHR system known as Kaiser Permanente (KP) Connect. It is a superior example of how an organization successfully deployed and implemented an EHR for a customer base exceeding nine million recipients of healthcare with a meticulously planned and thorough organizational design. The authors discuss and explore the MTF interviews and textual data while simultaneously applying and searching for themes related to the star model in the next chapter.

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IV. ANALYSIS

A. DATA

Creswell (2009) declared, “The idea behind qualitative research is to purposefully select participants or sites (or documents and visual material) that will best help the researcher understand the problem and the research question” (p. 178). The authors of this thesis examine and explore both documents and interview materials to identify themes related to the five elements of the star model. The public and private documents from DHA include EHR deployment timeline presentations, journal articles, newsletters, and other available material regarding the EHR on the DHA websites. The interviews were conducted on site at two locations in a face-to-face format with several follow-up emails with site chief information officers (CIO) who are directly involved in the EHR deployment and implementation. Specifically, the primary objective of the authors in this section is to provide readers a textual analysis of the DHA documents and an examination of the interview materials collected to identify themes and issues related to the star model.

1. Textual Analysis

The star model is a means to solve five critical design issues, which large organizations struggle to confront in the initial years of operation and the years beyond initial operation. The DHA was created by Congress in 2013, which mandated that it begin the initial operating capability (initial operation) in 2014 and have full operating capability (full operation) in 2015 (Defense Health Agency, n.d.). The Congress set forth an objective to the DHA: to create an enterprise-wide cost savings in DOD healthcare within the MHS.

The DHA organization is a relatively new agency, but it consists of three component services’ medical personnel (active military, civil service, and contract employees) who are familiar with the Military Health System, including its health information technology (HIT) systems, business processes, and structural and strategic elements. The key issues are the three component services, the respective MTFs, and

medical personnel adapting to and changing within the new MHS milieu under the direction of DHA. Organizational adaptation is an essential characteristic in the healthcare realm due to the continuous need to reduce costs, improve quality, and the rapid deployment of medical technologies and e-health systems. The success and viability of the MHS depends on its adaptation in the new MHS environment.

The reader must be aware that adaptation in the MHS environment is no easy feat. The DHA manages and oversees 10 shared services and six directorates (Defense Health Agency, n.d.). The HIT Directorate is one of six subordinate directorates that is managed by appointed senior leadership within the DHA. In addition, the HIT Directorate execute and manage the implementation and deployment of the EHR, which includes the congressional mandate to reduce HIT costs as well as create an efficient and effective MHS environment of HIT systems. The key to adaptation is to establish an organizational framework that ensures the EHR is deployed and adopted successfully across the enterprise. Additionally, the DHA needs to cultivate an environment in which personnel strive for high quality and customer focused HIT.

The below sections explore and critically analyze the five elements of the star model within the DHAs HIT Directorate and the data (documents and presentations) acquired from its websites related to the EHR and its implementation across the MHS.

a. Strategy

The components of an organizations strategy are its vision, mission, overarching goals, leadership's understanding of external factors (e.g., emerging technologies, customers), and its capabilities (Kates & Galbraith, 2007). The DHAs website and the included correspondence describes the mission, operating principals of the HIT Directorate, benefits of the new organization, and the focus/quadruple aim (better care, better health, lower cost, and increased readiness) of the DHA (Defense Health Agency, n.d.). There is no discussion or specific description of the organization's overarching strategic goals, strategic initiatives, or capabilities regarding HIT readily available to DHA employees and the public.

On the website, the authors discovered a strategic presentation prepared by the HIT Directorate, and it was referred to as the *Interactive City Plan* of 2016 (see Figure 7)

(Defense Health Agency, n.d.). It discussed the services offered by the HIT Directorate, senior level (DOD and DHA) requirements, and HIT resources available to the DHA (Defense Health Agency, n.d.). The intended audience appears to be for general and senior officers, civil service executives, Office of the Secretary of Defense, and other related stakeholders. There is no specific strategic document or material available on the websites outlining the strategic direction of the DHA.

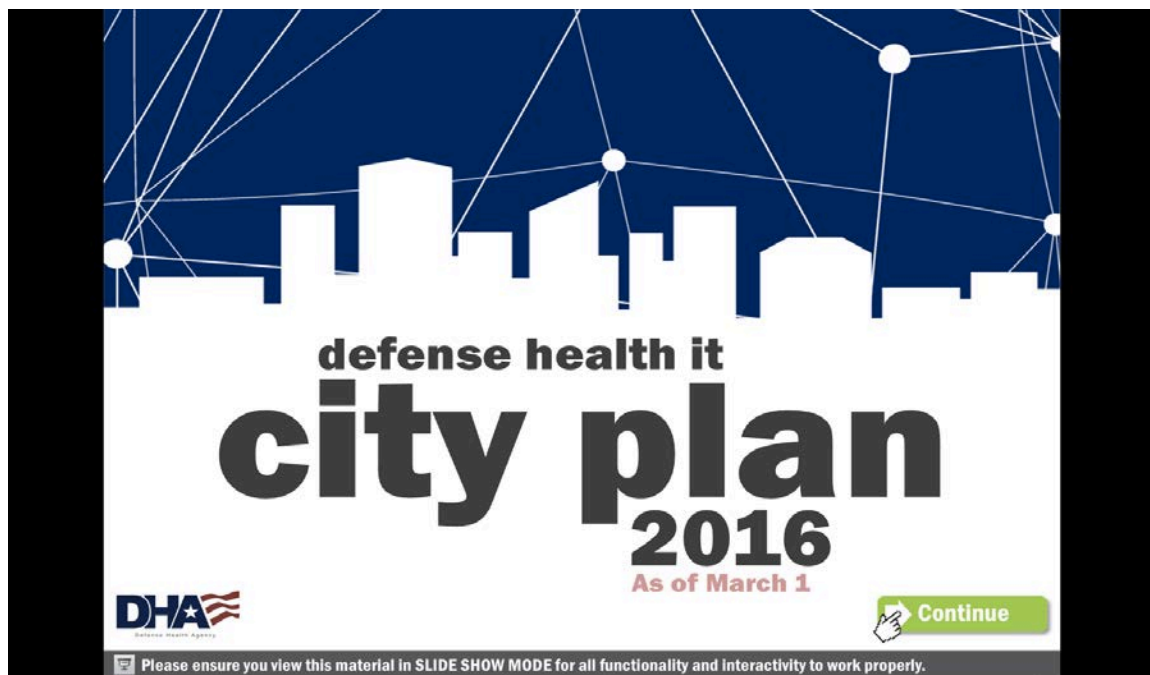


Figure 7. DHA Health IT City Plan 2016. Source: Defense Health Agency (n.d.).

Also, the authors discovered strategy related information under the Defense Health Management Systems (DHMS) section within the DHA website, and it included strategic information regarding the deployment of the EHR in the Pacific Northwest (PNW) region, which consists of the test sites for the initial deployment of the EHR across the three component services' MTFs (n.d.). Specifically, it was an abbreviated deployment strategy listed under the program executive officer (PEO) section within the DHMS website (see Figure 8). The DHMS section of the DHA website offers several handouts and webpages displaying 11 guiding principles related to EHR implementation,

abbreviated strategy of the EHR deployment in the PNW, and DHAs deployment approach in the PNW region (see Figure 9) (Defense Health Management Systems [DHMS], n.d.).

There was no clear or consistent set of documents, or other materials, on the DHA website outlining or describing in any detail the strategy or related initiatives of this new organization. The goal of this textual data collection was to search for and acquire readily available materials related to the DHA's strategic vision, or direction of DHA and the MHS, for the both the public and DHA employees. It was not discovered in this search, and the authors could not easily deduce an overarching strategy or strategic direction from the available information.

DEPLOYMENT STRATEGY

In partnership with the DHA, the Services, and industry, DHMSM continually defines a deployment and sustainment plan to optimize the delivery of the modernized EHR with minimal disruption to the military healthcare community and our beneficiaries.

The DHMSM program establishes two program segments to support deployment of the EHR system to the DoD enterprise. Segment 1 focuses on all medical and dental services delivered by permanent fixed facilities worldwide. Segment 2 focuses on deploying the EHR system to operational medicine environments including, but not limited to: theater hospitals, hospital ships, forward resuscitative sites, naval surface ships, and submarines.

Deployment is built on a "wave" model. IOC is the first wave to receive the new EHR. Deployment to the first sites in the Puget Sound Region will begin by the end of calendar year 2016.



Deployment Approach:

Change Management, Training, and Communications are critical to the successful deployment of the modernized EHR System. Together, these three pillars will maximize the understanding, willingness, and ability of DoD healthcare professionals during transition to the new EHR.



Change Management

- Stakeholder analysis
- Change network
- Change impact assessments
- Super User calls
- Change discussion workshops
- User adoption activities



Training

- Onsite and virtual instructor-led-training (ILT)
- Computer-based training (CBT)
- 90-day post-Go Live over-the-shoulder (OTS) training



Communications

- General program messages
- Deployment messages - key milestones
- Knowledge transfer messages
- Frequently Asked Questions (FAQs)
- Talking Points
- Solutions Handbook
- Command Briefs

Distribution A: Approved for Public Release

Figure 8. DHA EHR Deployment Strategy in the PNW. Source: Defense Health Management Systems (n.d.).



Figure 9. DHA EHR Guiding Principles. Source: Defense Health Management Systems (n.d.).

b. *Structure*

The structure of an organization determines where authority and power are located (Kates & Galbraith, 2007). The DHA is a military organization, and it clearly identifies where its centers of formal authority and power are at the most senior levels (see Figure 10). Kates and Galbraith (2007) identified four areas wherein work units are formed in an organization. Similarly, the HIT directorate and its work units appear to have been developed around the four areas: geographical location, functional areas, customers, and IT products. This is typical in the defense environment with military installations and MTFs spanning across the globe in dislocated, austere, and sometimes isolated environments. It requires a unique set of skills and knowledge to operate and manage the MTFs, and they require the assistance of higher headquarters to complement it in achieving its mission at the local/micro level. The organizational structure identified

in Figure 10 enables the DHA to execute its assigned mission effectively and efficiently from an enterprise perspective, but it is not clear that it is designed to assist the lower echelons and MTFs with enterprise issues or problems that may arise with the EHR. The deployment and implementation of the EHR will span across nearly 1,000 facilities and 220,000 medical personnel, affecting over 9 million recipients of healthcare, and there is no organizational structure to address and link the deployment and implementation strategy of the EHR across the MHS (Defense Health Agency, n.d.).

The authors were unable to identify or discover additional organizational structure diagrams and directives that established reporting relationships, specific communication channels, and power distribution within the DHA. Additionally, there was no overarching information related to key leadership roles (other than the most senior positions within DHA and the HIT Directorate), operating models (IT organizational structures), or the identification of the sub-organizations or work centers executing the strategic imperatives (primarily focused on the EHR) of the DHA. It is abundantly clear there are limited reporting relationships by reviewing the websites and its available materials, and it is unclear how the lower-echelon organizations, work units, and MTFs communicate to the DHA.

It is clearly outlined within the organization structure that the HIT Directorates' responsibility is to the MHS HIT enterprise (Defense Health Agency, n.d.). Unfortunately, there is not a sole artifact identifying mid- to lower-level organizational relationships or roles, communication methods, and the articulation of the operating models. This includes the lack of the information regarding the organizational structures at the lower organizational levels of the DHA and the HIT Directorate. Nonetheless, there is one entity, DHMS, that has been identified as deploying the EHR across the PNW region. In addition, it appears that DHMS will be executing and managing the enormous task of the EHR deployment and implementation alongside the HIT Directorate (DHMS, n.d.).

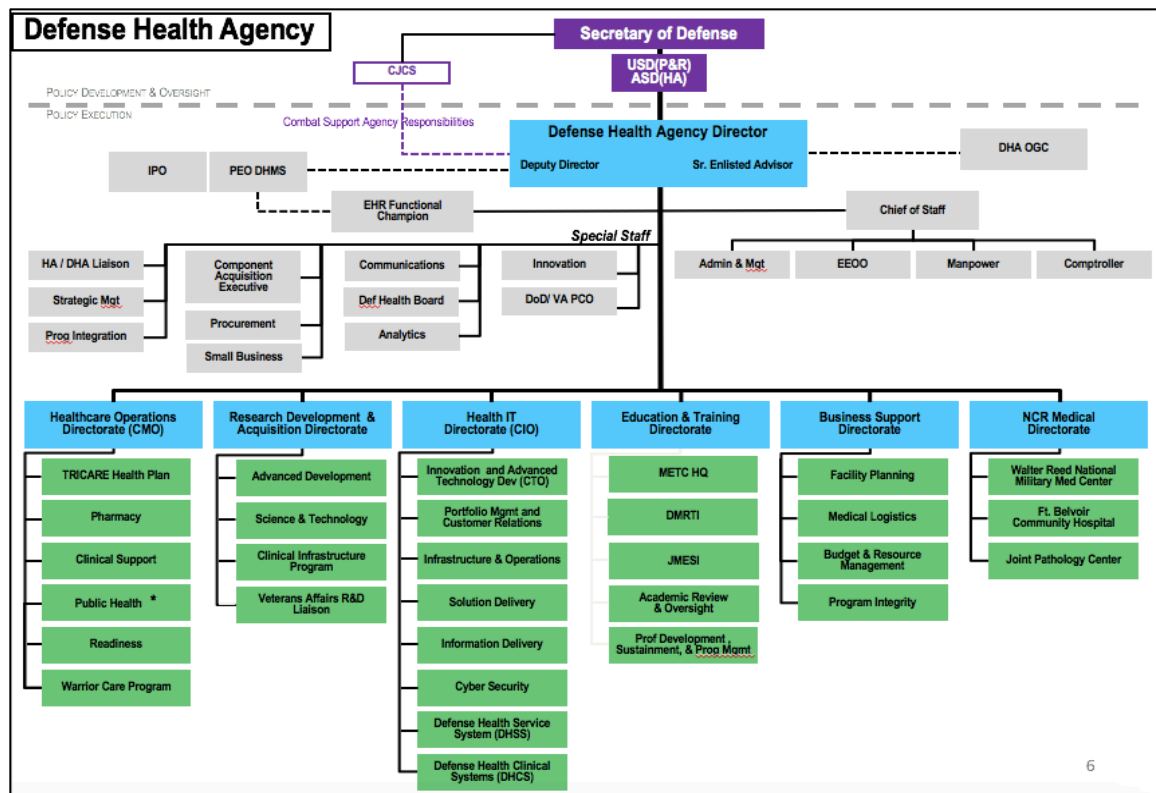


Figure 10. Defense Health Agency Organizational Structure. Source: Defense Health Agency (n.d.).

c. Processes

The pathway to solving the barriers and challenges associated with strategy and structure are the implementation of business processes and lateral connections. Kates and Galbraith state, “Processes and lateral connections provide the required mechanisms of integration” in an organization (2007, p. 17). The available DHA information offered little to no information related to business processes. Additionally, the information provided on its websites is primarily focused on the transition of the DHA and its internal human resources processes, security, localized infrastructure support, DHA IT helpdesk/IT support, training, and finance (Defense Health Agency, n.d.). Furthermore, there are no directives or master documents that outline or describe DHA business processes. The authors understand they are not privy to all the interworkings of DHA business processes, and the information is not readily available to all DHA employees, military personnel, or the public.

The DHMS site stated its overarching goals and communicated actions regarding the possible development of business processes with the EHR deployment in the PNW (see Figure 8). The DHMS material under its website emphasized processes guided by project management, change management, and consistent and transparent communications to the MTFs within the PNW region (DHMS, n.d.). This does not include the MTFs outside the PNW or the future process goals of the EHR project. DHMS (n.d.) declared that it visited the PNW MTFs to conduct model systems reviews, which is to assist the sites with the EHR deployment, identify site shortfalls related to the EHR, and change management issues. No other business process or lateral connection information was discovered by the authors.

The key importance of business processes and lateral connections is its ability to remove the organizational silos that prevent people from working together. The material on the DHMS site indicates there is little organizational movement or development in business processes, process engineering, and the creation of lateral connections.

d. Rewards

Rewards and metrics “align individual behaviors and performance with the organization’s goals” (Kates & Galbraith, 2007, p. 21). These systems motivate employees and cultivate behaviors that lead to collaboration and partnership within an organization (Kates & Galbraith, 2007; Standing & Cripps, 2015). The DHA offered no specific incentives, rewards, or metrics on its websites or related information sources. This does not mean employees are not recognized for their diligent efforts and hard work in DHA; however, a system of rewards may not necessarily exist. There were social media posts and other news posts applauding DHA employees for the work they accomplished, and there are quarterly town hall meetings that provide awards to civilian and military employees (Defense Health Agency, n.d.). The authors searched for rewards, incentives, and related metrics outside the status quo for government civil servants and military personnel and were unable to discover any information related to an organized system of rewards or incentives related to the star model that cultivate or modify organizational behaviors.

e. People

The people dimension of this analysis involved the evaluation of human resource practices and policies for staffing, selection, development, and training of employees. It essentially creates the mindsets and skillsets of the personnel within an organization. The DHA has no information in any form related to the building of skillsets and mindsets across the HIT enterprise at any level of the organization. While there is human resource contact information and transition of the human resource functions for the component services personnel into the DHA information, there is no evidence indicating the building or forming of employee skillsets and mindsets.

The DHMS (n.d.) website included material in May 2016 that alluded to addressing several of the mentioned issues. For instance, DHMS (n.d.) deployed several model systems review teams in the PNW to evaluate and identify training requirements for the EHR for MTF personnel, EHR change adoption issues, and change management issues. This indicates the DHA is at the precipice of the skillset and mindset development of personnel, and it will need to take great efforts to design an organization that builds and creates the mindsets and skillsets required for its employees and military personnel to implement the EHR successfully.

2. Site Interviews

For this case study, the authors conducted two interviews with staff from separate sites involved in the DHA implementation of the MHS GENESIS EHR project. Each site was involved at different stages of implementation. Site 1 was considered the test site for the project while site 2 was in the preparation phase of pre-deployment. Data collection at each site consisted of face-to-face interviews with chief information officers (CIO) and key personnel within the respective IT departments. Key personnel included information assurance officers (IAOs), network administrators, and system administrators. Group interviews were conducted 70–90 minutes in duration and were identical in questionnaire content across the two sites. Having the diversity of multiple levels of leadership allowed the researchers to explore a variety of issues presenting competing demands across the

area of responsibility. Interviewers asked questions unique and specific to the mission of the MHS GENESIS project and how it affected each site specifically.

The authors organized the data according to Galbraith's five elements of the star model. Table 1 represents an illustration of data received during interviews which are transcribed in the appendix. Focusing on the main drivers as well as benefits and barriers to implementation, the authors intend to generate key success factors to the sustainment of the EHR to provide recommendations to DHA leadership.

Table 1. Star Model Elements Comparison within Interviews

Star Model Elements	DHA Site 1	DHA Site 2
Strategy	<ul style="list-style-type: none"> • Zero communication of leadership's overarching philosophy (goals, objectives, and milestones) • Model is to deploy and hand-off to MTF 	<ul style="list-style-type: none"> • Zero communication of leadership philosophy (goals, objectives, and milestones) • Model is to deploy and hand-off to MTF
Structure	<ul style="list-style-type: none"> • Organizational charts only display heads/chairs at highest levels • Contact and communication is difficult at all levels • No standardization or established policies • Collaboration shortfalls (silos) force issues in creating policy • Simplification and limitation of distribution points does not support the site specific needs to meet policy 	<ul style="list-style-type: none"> • Organizational charts only display heads/chairs • Contact is difficult • No standardization or established policy
Processes	<ul style="list-style-type: none"> • Schedule driven as opposed to quality • Dissimilar regulations by service for violations of use policy • Changes in personnel not communicated • Little to no guidance is published prior to action being taken on project task • Repair philosophy vice successful integration • Small changes are taking weeks to months which should only take days 	<ul style="list-style-type: none"> • Schedule driven as opposed to quality • Changes in personnel not communicated • Little to no guidance is published prior to action being taken on project task • Emphasis on infrastructure needs are not addressed over deployment timeline
Rewards	<ul style="list-style-type: none"> • No system exists 	<ul style="list-style-type: none"> • No system exists
People	<ul style="list-style-type: none"> • No teams exist to manage change • Feedback is not accepted and utilized • No project management or change management involvement in the early stages 	<ul style="list-style-type: none"> • No teams exist to manage change • Feedback is not accepted and utilized by DHA

a. DHA Site 1, Navy Medicine West Case

Site 1 a medium sized MTF operating within the initial test phase of DHA's EHR implementation project. Located in the Pacific Northwest (PNW), the specific testing area was selected primarily due to the existence of all three component services represented in the state of Washington. DHA initiated the implementation from a top-down approach driven by the DHA HIT Directorate. Beginning in February of 2016, DHA established a small footprint within the PNW to begin pre-implementation processes prior to project launch. The DHA acquired contracted services to conduct the pre-implementation and implementation of the EHR product. Immediately, project schedules were affected and shifted for primarily two reasons. One, MTFs were not notified of the arrival date of the contracted employees, and two, contract personnel were unable to gain access to the military installations because there was no prior notification or communication with the MTF IT leadership or supporting technicians.

Processes, both lateral and vertical, introduced challenges to the organization. Kates and Galbraith (2007) defined processes as vertical and lateral in nature. According to them, vertical processes are centered around business planning, and lateral processes are designed around workflow. At Site 1, vertical changes have not been communicated by DHA, while changes in organizational leadership preclude site representatives from validating implementation processes with DHA project points of contact (POCs). Laterally, teams lack trust when implementing similar processes across different layers of the organizational implementation. This is mostly due to the lack of a communicated organizational framework from the DHA and the inability to communicate with POCs creates a barrier to implementation.

Kates and Galbraith (2007) stated that structure determines the placement of power and authority within an organization. With DHA not clearly communicating changes to the organizational structure (hierarchy) to the site, this barrier to implementation introduces an opportunity for project delays within the schedule regarding the EHR implementation. Being schedule driven opposed to performance and quality driven, these changes contradict DHA's implementation philosophy, which is to deliver a high quality and effective EHR product. Lacking quality control throughout the

process further delays the schedule and adds an additional barrier to implementation. Insisting on maintaining the schedule, DHA has compressed the timeline in an attempt to maintain its consistency with the original schedule. Describing strategy as the definition of an organization's formula for success, Kates and Galbraith (2007) suggested that an organization's strategy needs to drive the project and exemplify the values and mission to be pursued. In this site's case, DHA has failed to clearly communicate a strategy and its strategic direction with the exception of the goal to reduce cost.

b. DHA Site 2, Navy Medicine West Case

This site is a small MTF operating within the preparation phase of pre-implementation. Located in the central region of California, Site 2 is designated as the initial implementation site for the actual MHS GENESIS project launch. Like Site 1, DHA initiated the pre-implementation from a top-down approach driven by the DHA HIT Directorate. Mostly remote, pre-implementation actions were communicated through teleconferences, e-mail correspondence, and video teleconferencing. No DHA footprint (supporting project personnel) is established at Site 2 as the project remains in the early phases of preparation. Communicating with Site 1 on a regular basis, personnel at Site 2 attempt to utilize a lessons-learned approach to the tasks associated with preparation for project launch. Still lacking a clearly communicated strategy, Site 2 experiences the same sacrifice and issues of performance and usability, and the site is being forced to be schedule driven. Other projects in progress operating laterally to MHS GENESIS, but are not associated directly with the EHR, present competing challenges, which are not addressed due to the inability to identify and communicate with POCs in the DHA.

During the data collection phase, the authors also experienced challenges obtaining organizational charts and POC listings to communicate questions to the DHA. A few individuals identified as key EHR project personnel failed to respond to multiple inquiries from the authors regarding MHS GENESIS.

Lastly, Site 2 had infrastructure challenges that present a significant threat to the success of the EHR. These challenges are the environmental and material conditions that do not allow the basic network framework to function and operate within the MTF to

implement MHS GENESIS with the branch, or satellite, health clinics associated with Site 2.

c. Comparison of Cases

Respondents from both sites revealed similar feedback to the questions involving the MHS GENESIS project (see Table 1). Although, there is a significant variance in the size between the MTFs, both sites communicated the same challenges revolving around organizational communication. Communication in these cases is specific to the MTF receiving information from DHA regarding the POCs and project actions associated with the various project phases. Along with communication issues, both sites addressed a challenge in DHA accepting or creating buy-in from end users to validate the efficacy of the new EHR product.

No system of rewards or incentives has been communicated to either site by DHA, nor are there quantifiable measurements of performance metrics to evaluate the efficacy of the EHR project. At both sites, personnel are organic to the MTF and are selected based on Office of Personnel Management criteria; therefore, they are removed organizationally from DHA. The only exception to this process is the assignment of contract personnel specifically associated with this project. Although at different stages of implementation of MHS GENESIS, both sites reported identical infrastructure challenges as DHA has instituted top-level organizational changes without addressing unique challenges organic to each site. At this point in the implementation of the new EHR, both sites would benefit from an implementation plan to integrate and align the organizational design aspects of Galbraith's star model.

B. INTERPRETATION OF THE DATA

Data interpretation, as stated by Creswell (2009), is making sense of and moving towards a deeper understanding of the data (similar to peeling off the layers of an onion). The authors will provide the readers a deeper understanding of the data evaluated in the textual and interview analysis in the below sections. The interpretation will provide the

readers a clear and concise evaluation of the data presented in this paper and assist in the critical evaluation of the DHA.

1. Textual Analysis

The components of an organization's strategy are its vision, mission, overarching goals, leadership's understanding of external factors, and its organizational capabilities. The DHAs website and related materials from this analysis described the mission, operating principals of the HIT Directorate, benefits of the organization across the MHS, and its quadruple focus. However, there is no discussion or specific description of the organizations overarching strategic goals, strategic initiatives, or capabilities regarding HIT readily available to DHA employees and the public.

Kates and Galbraith (2007) stated that identifying and realizing the organizations capabilities is the initial "step in drawing the connection between strategy and the form of the organization" (p. 8). Capabilities and the organizational implications of the selected capabilities must be developed to form a basis for strategic alternatives, and senior leadership needs to develop metrics to assist in the gauging of progress (Kates & Galbraith, 2007). Moreover, it is the senior leadership who is has the responsibility of identifying organizational capabilities and the design of the organization. This responsibility must not be delegated as it requires the attention and due diligence of senior leadership (Kates & Galbraith, 2007).

There was no clear or consistent set of documents or materials on the DHA website outlining or describing in any detail the strategy, capabilities, or related initiatives of this new organization. The goal of the authors was to acquire and explore the available source documents or related material identifying and describing the DHA's strategic vision or the direction of DHA for the both the public and DHA employees. They did not discover this in their search, and the authors could not easily deduce an overarching strategic direction from the available information.

The structure of an organization determines the location of authority and power. The DHA is a military organization, and it clearly identifies the location of its formal authority and power, which exists at the most senior levels. The organizational structure

(identified in Figure 10) enables the DHA to effectively and efficiently execute its assigned mission from an enterprise perspective, but it does not appear it is designed to assist the lower echelons, sub-organizations, and MTFs across the HIT enterprise. There is not a sole artifact specifying mid- to lower-level organizational relationships or roles, communication methods, and the articulation of the selected IT operating models. This includes a significant lack of the information regarding the organizational structures at the lower levels of the DHA, HIT Directorate, and the connections to the MTFs. This will prove to be cumbersome with the deployment and implementation of an EHR that will span across nearly 1,000 facilities and 220,000 medical personnel or end-users. Furthermore, ineffective and inefficient organizational structures will make it difficult to align the design elements with the strategy (Kates & Galbraith, 2007).

The means to solving the barriers and challenges associated with strategy and structure are the implementation of business processes and lateral connections. The DHA information offered miniscule information related to business processes and lateral connections. In addition, it is primarily focused on the transition of the DHA and the internal processes for its employees and not the HIT enterprise. The key importance of business processes and lateral connections is their ability to remove the organizational silos preventing people from working together—this is a significant finding. Additionally, processes and lateral connections are the primary means for coordinating work unit activities, and they allow organizations to be attuned to multiple constituencies (Kates & Galbraith, 2007). These two dimensions increase the ability of senior leadership and the organization to expeditiously respond to opportunities and challenges across an enterprise with initiatives, such as the EHR, and the lack of the processes and lateral connections could create an environment of organizational inertia (Kates & Galbraith, 2007).

Rewards and metrics align employee behaviors and performance with an organization's goals and objectives. These systems motivate employees and cultivate an environment of collaboration and partnership within an organization. The DHA offered no specific incentives, rewards, or metrics within the material and documents available, and the authors were unable to explore or evaluate information related to an organized

system of rewards or incentives related to the star model's recommendations. Civil service and contracted employee dynamics create issues for federal agencies regarding offering variable compensation packages, incentives, and stock options, but there are other available options to offer as rewards or incentives outside the normative behavior of the federal government. The success of an organization necessitates the development of a defined rewards system. Organizations with reward and incentives systems communicate the organizations goals and values "more clearly than any written statement can" (Kates & Galbraith, 2007, p. 21). These systems must be included in the organizational design of any large organization such as the DHA or other healthcare organizations.

The people dimension of this analysis involved the evaluation of human resource practices and policies for staffing, selection, development, and training of employees. These practices and policies create the necessary and required mindsets and skillsets of the personnel within an organization. As Kates and Galbraith explicate, "Complex organizations require employees at all levels to have a fundamental set of competencies to interact across organizational boundaries, participate on teams, and make decisions that take multiple perspectives in account" (2007, p. 22). The DHA has no information related to the building of skillsets and mindsets across the HIT enterprise at any level of the organization. These are not created at the onset of an organizations initial operation, and it requires considerable time and effort to create within an organization. DHA was created in 2013, so does this mean the DHA is at the precipitous of the development in building the skillsets and mindsets of its personnel? If so, it will need to take great efforts to design an organization that builds and creates the mindsets and skillsets required for its employees and military personnel to successfully implement and adopt the EHR.

2. Interview Analysis

Both sites experienced shortfalls due to the lack of an implementation and sustainment plan that utilized key organizational success criteria associated with the star model. The authors identified the key challenges categorized under each star model attribute under Table 1. Data was derived from the responses to questions directed at sites

1 and 2 during interviews with IT professionals involved in the MHS GENESIS project. The transcribed data is available via transcripts within Appendix A.

Both sites have been experiencing the absence of a clear and defined strategy for the MHS GENESIS project from DHA. In the absence of a clear and defined strategy, change management efforts are severely affected when sites will be unable to implement the new EHR that meets the needs of the users and the MTF. Beer and Nohria (2011) noted that 70 percent of change initiatives fail due to numerous change methods, offering conflicting advice or guidance to projects. These challenges affect both MTFs and introduce barriers to implementation on a multitude of levels. In the absence of a clear strategy, future sites within the MHS will experience identical challenges, given DHA's inability to communicate a strategy after Site 1 experienced challenges during implementation and Site 2 during pre-implementation. Appearing similar to an engineering based operating model, the MHS GENESIS project takes a hands-off approach to implementation leaving the MTFs to operate, maintain, and sustain the EHR product independently following its implementation.

This research data suggests that DHA has identified an organizational structure and hierarchy, but it fails to clearly communicate changes in personnel within subordinate organizations. Downey, Galbraith, and Kates (2001) stated that the most optimal structure aids an organization in achieving its strategy and strategic direction. With a failure to communicate changes in the organizational hierarchy, DHA is also experiencing a failed organizational structure in the MHS GENESIS project.

During the data collection phase, the authors noted that DHA failed to elicit feedback from site personnel to cultivate and gain user buy-in. Heath (2016) concluded that no EHR project may be successful without buy-in from medical providers (physician, nursing, and administrator groups) and end users. Teams made up of various individuals at different levels of the organization provide valuable feedback, which ensures the EHR project is beneficial for all organizational members (Heath, 2016). Interviewee's from both sites described a silo effect wherein project task completion was driven independently and without regard to obvious effects of negative project outcomes.

There is no system of rewards within either organization for the MHS GENESIS project. If there is a rewards system, it has not been clearly communicated to the site leadership or related IT personnel.

Within DHA, personnel in the organizational hierarchy are selected through a strenuous vetting process. With the exception of contract personnel, these personnel at Site 1 were not properly and adequately vetted with regard to military installation and MTF access and network access, which resulted in gross delays of the project's schedule. This includes a lack of cross-functional relationships among different contracted companies and the site. Each task oriented entity or contractor company conducted its own specific tasks and was not concerned with the effects of its actions or the project's progress. Additionally, there was a general lack of understanding of MTF IT leadership and technicians, and a general consideration, as expected in the business world, of the sites specific needs was blatantly disregarded by those contracted project personnel. Collaboration was anticipated and expected by DHA decision makers but without regard to organizational issues and barriers at the site level. Often, several individual project team members were unaware of the site personnel assigned to them and were oblivious with whom to collaborate at the site. It required several poorly executed project events to force collaboration between IT personnel at the site, and several of these contracted individuals were unaware of the existence of sites IT personnel and disregarded the importance of those personnel until forcibly informed to work with the IT staff.

In conclusion, this chapter has explored themes specifically attributed to communication issues, lateral and vertical processes, lack of quantifiable project metrics, and several other problematic areas outlined in the star model. Moreover, DHA's approach to the MHS GENESIS project is not adequately aligned with Kates and Galbraith's (2007) star model. Failure to communicate a strategic vision and associated strategic initiatives as well as failure to create an organizational structure to support the implementation and sustainment goals of the MHS GENESIS project inserts challenges within the organization. This includes a delay in progression, which may propagate negative effects across the entire enterprise. The authors offer recommendations within

the findings and conclusion chapter to cultivate and promote a positive change in the MHS organizational environment.

V. FINDINGS, CONCLUSION, AND RECOMMENDATIONS

A. FINDINGS

The researchers were able to identify and explore a variety of factors impacting the progress of the EHR implementation and deployment across the MHS enterprise. These factors are rooted in the five organizational design challenges outlined by Kates and Galbraith (2007). These factors or themes were identified in the data from the cases and textual analysis. They are:

1. Significant communication issues between DHA and the MTFs receiving the EHR. The communication issues include, but are not limited to, the following:
 - EHR implementation and sustainment
 - EHR project phase details for MTFs
 - DHA strategy and strategic initiatives
 - DHA organizational structures and related information and business processes
 - EHR training; and rewards systems
2. No EHR buy-in or creation of buy-in exists for clinical groups, MTF IT technicians and staff, and non-clinical users.
3. Change and project management ideals, knowledge, or related processes not being applied to the implementation and deployment of the EHR.
4. There are no metrics to evaluate and gauge the progress, performance, quality, and outcomes of the EHR product in its deployment and implementation.
5. The EHR project is schedule driven opposed to performance driven; IT engineering focused system opposed to an end user focused system. MHS GENESIS project takes a hands-off approach to implementation leaving the MTFs to operate, maintain, and sustain the EHR product independently following its implementation.

Project complexity creates a barrier to an organization's ability to implement and sustain a new technology. This complexity may be observed across the MHS enterprise at both the MTF and DHA HIT organizational levels. DHA is a static organization focused

on internal processes, systems of governance, and executing policy and directives from higher headquarters. MTFs are professional organizations conducting operations based upon on a standardization of medical practice, skills, and knowledge, and they are purely focused on delivering healthcare services. Additionally, MTFs are guided by DHA policies on the macro level; however, at the micro level, the MTFs generate site specific processes and process governance, which are unique to the organization. Finding a common ground between complexity and simplicity through the application of an organizational design will increase the effectiveness and efficiency of the MHS GENESIS project. This is a means to addressing the findings posed by the authors of this study.

Jansen, Hocesvar, Rendon, and Thomas (2009) cited that goals are operationalized and effectiveness is measured through organizational metrics. The fields of project and change management offer a plethora of approaches to measure effectiveness and outcomes of a project and may be a solution to the metric issue in MHS GENESIS. Using a practical method to measure EHR project effectiveness and outcomes offers a means for senior leadership to gauge site specific progress within the various stages of the EHR project. MTFs vary by size, type, and operational application, and an EHR project that is focused on the individual MTF and its specific needs is bound to be successful. Lastly, metrics offer organizations a method to measure performance that cultivates and fosters a system of rewards, which is needed across the MHS enterprise (Jansen et al., 2009).

Lateral and vertical processes are independent variables that are often interconnected in an organization. Self-formed lateral processes occurred during in this project at both sites. For instance, it happened when Site 2 communicated with Site 1 to acquire project information regarding lessons learned. These relationships need to be fostered across the enterprise to preclude similar challenges from further disrupting the MHS GENESIS implementation. Additionally, these processes will spill into the sustainment phase of the project once the EHR is fully implemented, and those outcomes could be disastrous to the enterprise. Jansen et al. (2009) described lateral processes as indispensable to the integration and coordination of different organizations such as the ones in the MHS and DHA. These conditions, effective vertical and lateral processes,

allow additional coordination at the lower levels of an organization, thus relieving the burden from the supporting work center within the DHA hierarchy.

B. CONCLUSION

Ciampa and Revels (2013) described organizational structures as “a framework which a group of like-minded people work on tasks for a common goal” (p. 37). Specifically, with healthcare organizations, the nature of their common goal presents challenges because of unique organizational culture, strategy, and its design (Ciampa & Revels, 2013). The strategy of an organization provides direction and vision to personnel involved in the execution of project processes. At the current state of DHA’s EHR implementation, the lack of a clear strategy has left sites independently searching for methods to overcome technical challenges and unique, site-specific problems, which preclude project stages of completion within the schedule parameters. Communicating DHA’s strategy at this critical phase of MHS GENESIS will provide timely direction, which could prevent a project failure. This small change, as simple as communicating a strategy, would offer clinicians, support staff, and most importantly, the IT community, direction to navigate MHS GENESIS forward.

As observed in feedback from Sites 1 and 2, the lack of a clearly communicated strategy has left gaps in implementation processes, which in turn have led to considerable delays in the MHS GENESIS project. Without a strategy, business processes are underdeveloped or nonexistent. The authors have concluded that neither a personnel development initiative nor a system of rewards is in place to motivate personnel involved in the implementation and adoption of the new EHR. Furthermore, the effects of these failed processes have extended small-scale project tasks, which would have normally taken days, into weeks to months.

Senior leadership uses vertical processes to communicate at all levels of the organization supporting MHS GENESIS. The structure of the organization must be transparency and consistency throughout the project to meet implementation goals and to establish an organizational framework for sustainment. Through cross-organizational teams, lateral processes would integrate leadership, clinicians, support staff, and

information professionals with DHA stakeholders and return feedback to project managers and change management teams. Given an opportunity to cultivate buy-in from physician leadership and clinical support teams, a measurable method of obtaining metrics would provide value to the organization and establish a framework for sustainment operations. When MTFs and supporting personnel do not have buy-in, the DHA cannot create an effective strategy for implementation and sustainment that is supported by the organizational structure it has established.

The contributions of this thesis are in discussion the value of organizational design and addressing the design challenges related to the implementation of a multi-billion dollar EHR system. In doing so, the authors have explored the five-design element of the star model and its application in the implementation and sustainment of the EHR. The two case studies and textual analysis have identified a set of reoccurring themes or organizational issues and the addressing those issues in the DHA is paramount to the success of the EHR project.

There are limitations of the work conducted in this thesis; it is an exploration of two sites, and the available textual data. However, future research is required to investigate the issues confronting the DHA and the MHS GENESIS project and to evaluate the application of an organizational design and associated methodologies. Organizational design models are of great value to a government agency they serve, and researchers need to evaluate and explore how the models are utilized in practice following the implementation phases in the out years of a project such as MHS GENESIS. In turn, the research, along with this study, may be shared with the appropriate senior leaders and stakeholders to form a purpose-driven strategy and approach to a healthcare organizations design, which will assist in overcoming the barriers and challenges it will face with enterprise projects.

C. RECOMMENDATIONS

Kates and Galbraith (2007) stated, “An organizational design change is a not decision. It is a project—project to build organizational infrastructure.” (p. 203). The organizational change they are referring to (or implementation of the EHR system in this

instance) requires enormous effort to build and implement, and it requires four elements to implement in an organization. The elements are: utilizing an organizational decision framework; goals, measures, and milestones; project management; and change management techniques (Kates & Galbraith, 2007). These elements have an enormous impact on how an organizational design is implemented, and they are paramount in the creation of an implementation plan to deploy a large enterprise project, such as the EHR (Kates & Galbraith, 2007; Nyberg & Sezgin, 2016). It is the responsibility of senior DHA leadership, the owners of the organizational design, and MHS stakeholders (MTFs and IT personnel) at all levels to create and execute a robust implementation and deployment plan based upon these four elements (Nyberg & Sezgin, 2016). The authors recommend the four elements to the DHA as outlined by Kate and Galbraith (2007). The details of the four elements are in the below sections.

1. Decision Framework

According to Kate and Galbraith, “Using a disciplined process and a clear framework helps to ensure that debates and decisions are based on comparisons of options against criteria rather than who wins a battle based on reputation, power, or persuasion” (2007, p. 203). Establishing a decision framework through coordinated efforts will reduce the burden of and barriers related to effective organizational communication within the DHA (Nyberg & Sezgin, 2016). In addition, a decision framework creates a common language within an organization and establishes a set of boundaries regarding the communication of decisions (Kates & Galbraith, 2007). There are a plethora of unanswered questions and organizational areas requiring attention in the DHA and MHS enterprise regarding strategy at all organizational levels. An effective decision framework will be a guiding light within the EHR deployment project throughout its duration and ensure deployment and implementation successfully occurs throughout the MTFs across the globe (Nyberg & Sezgin, 2016). This decision framework needs to be available to DHA employees and personnel at all levels of the organization to instill transparency and redundancy throughout the organization.

2. Goals, Measures, and Milestones

Kates and Galbraith (2007) stated that strategy determines the overall goal or major objective of an enterprise project, but the organizational design criteria guides the overarching goals into measureable and attainable milestones. How will the DHA implement its organizational design, deploy the EHR, and build organizational capabilities (Nyberg & Sezgin, 2016)? This will be accomplished through the development of goals, measures, and milestones, which are attained through both qualitative and quantitative metrics (Kates & Galbraith, 2007). In addition, Weill and Ross (2009) added that post-implementation reviews (PIRs) need to be incorporated into an IT organization that is deploying a new technology platform, which will track the value of IT and utilize that acquired information to increase organizational learning and knowledge. The absence or lack of goals, measures, and milestones will do nothing more than delay the implementation of the EHR across the MHS, and it a necessity to have a clear establishment of these three items (Nyberg & Sezgin, 2016).

3. Project Management

Project management and implementation is where the real work occurs within an enterprise (Kates & Galbraith, 2007). Additionally, project management is the keystone in the implementation and deployment of the EHR, and it is the functional area that is responsible for project methodology and oversight (Weill & Ross, 2009). The identified project management office, the Program Executive Office in this instance, and its sub-organizations will execute the organizational strategy and the identified goals, measures, and milestones for the DHA. These mid- to senior-level project managers will promulgate the organizational design and execute the goals set-forth by the DHA. The project management office and related sub-organizations are integral members of the DHA leadership team that need to be responsible and accountable for ensuring the momentum of the organizational design perseveres throughout the deployment of the EHR across the MHS (Kates & Galbraith, 2007; Weill & Ross, 2009).

Additionally, project management teams need to be cognizant of two dimensions related to the EHR project. They are within the initial planning and execution phases of a

project. Gary (2012) declared that project management is a tool utilized to remove uncertainty, but this does not always occur in complex enterprise projects. Gary (2012) implored her readers to avoid expeditiously initiating large projects and to address project issues during the *fuzzy frontend* of the project initialization. The fuzzy frontend is the initial planning phase wherein uncertainty and project risks are high due to lack of information and other project data. Avoiding this fuzzy frontend is achieved through a clear problem definition, exploration of project alternatives, and evaluating and redesigning business processes of a project (Gary, 2012).

The next dimension occurs during the execution phase of a project. Cross (2012) stated project management teams should not attempt to rapidly develop and create a flawless product in timely manner. The primary goal in project management is quality and accuracy (or performance) over speed and timeliness. Moe (2012) notes, “Government agencies don’t like failure because it ruins political careers ... but usually what they end up with is an even bigger failure—and no clue about why it happened” (p. 98). Projects need to focus on functionality for the end-user and other enterprise users; this may be best achieved by evaluating and reducing the functionality delivered in each phase of execution (Moe, 2012). The project may require additional phases or time to achieve the desired functionality, and this will assist in avoiding many of the pitfalls associated with project management. This phased and quality focused approach may reduce the amount of cost and schedule overruns. Moe (2012) explains, “80% of cost and schedule overruns are usually due to the last 10% to 20% of requested functionality” in projects (p. 98). The timeliness and speedy delivery of the EHR system is not as important as the functionality, performance, and quality of the EHR system for the end-users.

4. Change Management

Another critical element in the implementation process is change management (Nyberg & Sezgin, 2016). The other elements of the implementation process will not be successful or easily applied without the application of change management across the entire MHS enterprise. Why implement change management across the MHS and in the

DHA? Change management focuses on the management of the human reaction to organizational changes and requires senior leadership and change management team's astute attention (Nyberg & Sezgin, 2016). Moreover, change management teams maintain open and frequent lines of organizational communication, build an understanding and commitment to the changes that will occur within the MHS HIT enterprise while establishing a feedback loop for all employees, ensuring the occurring changes and leadership decisions are clearly understood (Kates & Galbraith, 2007; Nyberg & Sezgin, 2016). This last element of the implementation process is the possibly the most crucial because a lack of understanding, degraded sense of buy-in, and poor communications will create an environment, even a hostile environment that may lead to the possible failure of the DHA's design and strategy, which is to implement and sustain the EHR system (Nyberg & Sezgin, 2016).

The authors conclude this thesis with an anecdote related to change management and a particular change agent or individual in the application of a clinical issue related to infection control. Hospital acquired infections affect two million patients a year in the United States, and it results in 90,000 deaths, and nearly six billion dollars in patient costs (Best & Neuhauser, 2004). Those rates and numbers would be exponentially higher if it were not for the work of Dr. Ignaz Semmelweis (Best & Neuhauser, 2004).

Dr. Semmelweis's case demonstrates the effectiveness of small modifications to a process in a healthcare organization and its effects across an enterprise. Dr. Semmelweis, or the father of infection control, is the story of handwashing and controlling infections in obstetrics areas of hospitals in the 1840s (Best & Neuhauser, 2004). The infection issue was related to puerperal (childbed) fever, which was highly pervasive and killed hundreds of thousands of delivering or expectant mothers across the world. Dr. Semmelweis was given an appointment as the managing physician in an obstetrics section of a hospital in Vienna in 1844, and he observed a stark difference of infection rates between two groups of clinicians who delivered newborns (Best & Neuhauser, 2004). He conducted a case-controlled analysis of patient infection rates of medical students, physicians, and nurse midwives who delivered newborns (Best & Neuhauser, 2004). Dr. Semmelweis observed the infection rates for patients of medical

students and physicians was as high as 18 percent opposed to the nurse midwives who experienced a two percent infection rate (Best & Neuhauser, 2004).

What was the cause of these significant differences? It needed to be explored further, and Dr. Semmelweiss considered several hypotheses and discovered a cause of the increased infection rates between the groups. Best and Neuhauser (2004) described that physicians and medical students were conducting autopsies and handling corpses prior to delivering the newborns, whereas the midwives were not handling any corpses prior to delivery. Dr. Semmelweiss immediately instituted mandatory handwashing policies for the medical students and physicians after this finding. That minor adjustment (change process) reduced the hospitals infection rate to less than one percent for all clinical groups (Best & Neuhauser, 2004). His findings and change to the pre-delivery process were one of the greatest medical discoveries of the nineteenth century—handwashing reduces infection rates greatly and saves lives—and it earned him the title of change agent by medical communities (Best & Neuhauser, 2004). It is this mindset, a proactive and intellectual approach to solve organizational issues, and the ability to act as change agent that will lead to the successful implementation and adoption of the EHR across the MHS enterprise.

In the end, it is the military members and other recipients of healthcare who we serve, and it is our duty to care for them in the most considerate, effective, and efficient means possible. This is best stated by Abraham Lincoln who declared, “To care for him who have borne the battle and for his widow, and his orphan” (U.S. Department of Veterans Affairs, 2015).

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APPENDIX A. INTERVIEW TRANSCRIPTS

A. INTERVIEW TRANSCRIPT SITE 1

1. What is current network footprint for the organization?

MEDCOI 17 Apr 2016
1000 users plus branch clinics
40,000 patients

2. What clinical areas does the organization support with the EHR currently in use?

Branch clinics and main facility

3. Are there any additional areas that will be gained by implementing the new product?

Armed Forces Health Longitudinal Technology Application (AHLTA)/Composite Health Care System (CHCS)—read only; JLV; Health Information Portal

4. What is the organization's EHR deployment timeline?

31 Jan 2017
Changes are communicated every week
Massive push planned
No accountability for missing deadlines

5. Are there additional resources needed to meet minimum specification from the vendor?

AVHE access
Citrix client—Cerner cloud in Kansas

6. How many users currently use the existing product?

1,000

7. Are there any lifecycle issues foreseen with regard to sustainment of the new EHR?

Control of the desktop to data center
Trying to avoid AHLTA issues; configuration is key and DHA will control
No guidance, different Navy culture, process guidance

Can field with medical Joint Active Directory (mJAD), MEDCOI, or other infrastructure

Citrix client—Cerner EHR

DHA must ensure infrastructure is prepared, ready. Cost efficient.

8. Do you have anything else to add regarding the EHR project?

Quarterly summit to collaborate

Philosophy change—SCM, GPOs, packages

Infighting—leads to weeks to months to accept small changes

Site visit by DHA, with DC issues, mJAD

120 days on board for 5 days of work; Out-brief addressed two weeks vice the 175 days on board

Collaboration issues, policy, etc. to set up new infrastructure

POC was created for DHA to act as intermediary

No sense of trust; Rights are not given to complete work; DHA desires to maintain control; Causing issues

Server utilization fails to meet site need.

Small pipe chokes feed; No redundancy is planned.

Centralized control to simplify and limit distribution points. No standardization exists and it is not tested; No simulation environment; Trouble shooting is done in place and live on active systems

Org charts are not made available that list POCs; Only DHA Chiefs are communicated to the site. POCs in DHA are difficult to contact

Philosophy is to save money and launch EHR by Jan 31, 2017

Unrealistic timeline, overly ambitious

Two teams to deploy all of WA; No collaboration is conducted; No site buy-in

Migration teams lack trust due to not knowing team dynamics or membership

Expectation management, self-regulating

SPAWAR model; deploy and hand off

Cerner training super users, non-IT personnel, overlooking training, no site migration teams exist at this point

Executive management does not understand compliance; Implementation of patching with elevated privileges; HBSS blocked; STIG requirement.

Zero footprint EHR; Cloud based Cerner product; Network loss is catastrophic

Communication across teams is non-existent

Rushed implementation to bridge into sustainment

Centralizing IT infrastructure; This will lead to shortfalls in uptime

Deploying untested solutions that fail to meet requirements, Security Policies, etc.

Not learning from mistakes; Instead of morphing tasks after previous site failure, they recreate the failure

Global service desk online; site not able to execute tech support until after Global Service Desk

DHA has stood up and there is no DHA policy on IT management

No tier one understanding of how all of these entities act together on a network/ site level

B. INTERVIEW TRANSCRIPT SITE 2

1. What is current network footprint for the organization?

MEDCOI

800 users + branch clinics

20,000 patients

2. What clinical areas does the organization support with the EHR currently in use?

Branch clinics and main facility

3. Are there any additional areas that will be gained by implementing the new product?

AHLTA/CHCS—read only; JLV; Health Information Portal

4. What is the organization's EHR deployment timeline?

May 2017

Changes are communicated every week

Massive push planned

No accountability for missing deadlines

5. Are there additional resources needed to meet minimum specification from the vendor?

AVHE access

Citrix client—Cerner cloud in Kansas

6. How many users currently use the existing product?

800

7. Are there any lifecycle issues foreseen with regard to sustainment of the new EHR?

Control of the desktop to data center

Trying to avoid AHLTA issues; configuration is key and DHA will control

No guidance, different Navy culture, process guidance

May field with mJAD, MEDCOI, or other infrastructure

Citrix client—Cerner EHR

DHA must ensure infrastructure is prepared, ready; Cost efficient.

Unique infrastructure issues with one specific branch clinic

8. Do you have anything else to add regarding the EHR project?

Permissions are limited and work is delayed due to remote users having to manage workload

Pre-implementation projects are delayed due to technical contradiction between systems

Project stages are delayed due to mJAD and infrastructure issues

Communicating schedule and workload is inconsistent

Changes are often more frequent than execution

Site 2 is relatively early in pre-implementation and is not experiencing many of the issues as Site 1 due to lack of schedule maturity

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APPENDIX B. MHS GENESIS HANDOUT

DoD Healthcare Management System Modernization

MHS GENESIS

DHMS

DHMSM

DMIR

JDMIS

DoD/VIA IPO

MHS GENESIS is the new electronic health record (EHR) managed by the DoD Healthcare Management System Modernization (DHMSM®) Program, under the Program Executive Office Defense Healthcare Management Systems (PEO DHMS).

WHAT IS MHS GENESIS?

MHS GENESIS integrates inpatient and outpatient best-of-suite solutions that will connect medical and dental information across the continuum of care, from point of injury to the military treatment facility (MTF). This includes garrison, operational, and en route care, increasing efficiencies for the beneficiaries and healthcare professionals. MHS GENESIS will replace select Department of Defense (DoD) legacy healthcare systems, including but not limited to: AHLTA, Composite Health Care System (CHCS), inpatient, and components of the Theater Medical Information Program-Joint (TMIP-J).

MHS GENESIS will support the availability of electronic health records for more than 9.4 million DoD beneficiaries and approximately 205,000 MHS personnel globally. It enables the application of standardized workflows, integrated health care delivery, and data standards for the improved and secure electronic exchange of medical and patient data. MHS GENESIS will deploy via a "wave" model, beginning in the Pacific Northwest.

KEY FEATURES

- Two-way communication
- Agile, responsive system which supports the delivery of high quality healthcare to our beneficiaries
- Integrated medical and dental record throughout the continuum of care

KEY BENEFITS

- Monitors a beneficiary's health status through greater population health data, tracking, and alerting capabilities.
- Improves our ability to monitor patient safety, outcomes, and operational and medical readiness
- Improves data access and sharing of health information across the spectrum of military operations, the Department of Veterans Affairs (VA) and civilian healthcare organizations
- Increases accessibility of integrated, evidenced-based healthcare delivery and decision-making

The diagram shows a central circle with the text "DEPARTMENT OF DEFENSE MHS GENESIS". Six surrounding circles are connected to the center by lines. Clockwise from top: "HIGH QUALITY HEALTHCARE DELIVERY" (with a box icon), "ONE RECORD" (with a document icon), "RELIABILITY" (with a checkmark icon), "EMERGING TECHNOLOGIES" (with a monitor icon), "IMPROVED USABILITY" (with a thumbs up icon), and "HIGH QUALITY HEALTHCARE DELIVERY" (with a box icon).

DoD Healthcare Management Systems Modernization (DHMSM®)
Program Management Office

T: 705-588-5860
1301 Wilson Blvd., Suite 810
Arlington, VA 22209

@DoD_DHMS

f Defense Healthcare Management Systems

www.health.mil/dhms
As of September 9, 2016
Distribution A: Approved for Public Release

Figure 11. MHS GENESIS Handout. Source: Defense Health Management Systems (n.d.).

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